

**DEPARTMENT OF HEALTH AND HUMAN SERVICES  
ADMINISTRATION FOR CHILDREN AND FAMILIES**

**INFORMATION SYSTEMS REVIEW GUIDE**

April 1992



## PREFACE

This *Information Systems Review Guide* was developed to support ACF professionals during the course of state systems reviews. Comments were requested and received from both central and regional office staff and were incorporated, wherever possible, in this guide.

Nonetheless, the true test of any manual is how well it supports reviewers in the performance of their assigned tasks and whether it remains relevant and useful. Therefore, the comment period on this guide remains open.

ACF welcomes suggestions from those using this guide. An *Evaluation, Comments, and Suggestions* form is included in Appendix G to this Guide. This form or any other written comments may be sent to:

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Administration for Children and Families  
Director, Office of State Systems  
370 L'Enfant Promenade, SW  
Washington, DC 20447-0001



## TABLE OF CONTENTS

I.	INTRODUCTION.....	I-1
A.	Background and Objectives .....	I-1
B.	Authority .....	I-2
C.	Audience .....	I-3
D.	How to Use This Guide .....	I-4
E.	Types of Review .....	I-5
F.	Overview of System Review Areas.....	I-7
1.	Management .....	I-7
2.	System Engineering.....	I-7
II.	FUNCTIONAL OVERVIEW OF THE REVIEW PROCESS .....	II-1
A.	Review Initiation.....	II-2
1.	Designate Team .....	II-3
2.	Schedule Review and Plan Reporting.....	II-6
3.	Estimate Review Costs and Benefits .....	II-6
B.	Pre-Review Phase and Preliminary Evaluation.....	II-6
1.	Analyze Documentation, Existing and Required.....	II-7
2.	Provide Preliminary Notice to State.....	II-9
3.	Review Additional Documentation.....	II-11
4.	Identify Preliminary Findings or Concerns .....	II-11
5.	Scope Review and Set Objectives.....	II-11
6.	Draft On-Site Agenda.....	II-12
7.	Conduct Conference Call with Review Team .....	II-13
8.	Finalize On-Site Review Arrangements with State .....	II-14

## II. FUNCTIONAL OVERVIEW OF THE REVIEW PROCESS, cont.

C. On-Site Review Phase .....	II-14
1. Conduct Entrance Conference .....	II-15
2. Review System Documentation .....	II-17
3. Interview System Users and Operators .....	II-17
4. View System Operations .....	II-18
5. Document Findings .....	II-18
6. Coordinate Findings in Team Conference .....	II-20
7. Notify RO and CO Management .....	II-21
8. Conduct Exit Conference .....	II-21
D. Post-Review Phase .....	II-22
1. Provide Preliminary Assessment .....	II-22
2. Conduct Conference Call .....	II-22
3. Conclude Team Assessments .....	II-24
4. Finalize Findings and Conclusions .....	II-24
5. Prepare Report .....	II-24
6. Notify State .....	II-26
7. Follow-Up .....	II-26

## III. MANAGEMENT REVIEW AREAS .....

III-1

A. Mission and Planning .....	III-2
B. Development .....	III-3
C. Implementation .....	III-4
D. Operations and Maintenance .....	III-5
E. Cross-Cutting Activities .....	III-5

## IV. SYSTEM ENGINEERING AND ARCHITECTURAL REVIEW .....

IV-1

A. System Effectiveness .....	IV-2
1. Perceived Validity .....	IV-2
2. Requirements Conformance .....	IV-3
3. System Availability .....	IV-3

4. Data Refreshment .....	IV-4
---------------------------	------

#### IV. SYSTEM ENGINEERING AND ARCHITECTURAL REVIEW, cont.

B. User Interface.....	IV-4
1. User Profile .....	IV-4
2. General Interface .....	IV-5
3. User Documentation .....	IV-6
4. User Support .....	IV-8
5. System Privacy / Sensitive Information .....	IV-9
C. Maintainability.....	IV-9
1. System Environment.....	IV-10
2. System Documentation .....	IV-11
3. Maintenance Action Types .....	IV-11
4. Code Quality .....	IV-13
5. Survivability .....	IV-14
D. System Attributes .....	IV-15
1. Configuration Management .....	IV-15
2. Telecommunications .....	IV-16
3. CASE Tool Usage .....	IV-18
4. Data Base Management Systems .....	IV-18
5. Portability .....	IV-20
E. Efficiency .....	IV-20
1. Software Efficiency.....	IV-21
2. Hardware Efficiency .....	IV-21
3. Hardware Inventory .....	IV-22
4. Efficiency Reporting .....	IV-22
5. Technological Opportunities .....	IV-23

#### V. REFERENCES ..... V-1

#### VI. APPENDICES

A. Sample Letters for Use During System Review .....	A-1
B. Sample Finding Summary Worksheets.....	B-1
C. Management Review Questions.....	C-1
D. System Engineering and Architectural Review Questions .....	D-1
E. Sample Report Outline .....	E-1



F. Reproducible Sample Finding Summary Worksheets .....	F-1
G. Evaluation, Comments, and Suggestions .....	G-1

## LIST OF EXHIBITS

Exhibit I-1	Types of Reviews Conducted on State Systems .....	I-6
Exhibit I-2	Information Systems Reviews .....	I-8
Exhibit II-1	Information System Review Methodology .....	II-1
Exhibit II-2	Review Initiation .....	II-4
Exhibit II-3	Pre-Review Phase .....	II-8
Exhibit II-4	Additional Information that May Be Required: Pre-Review, On-Site Review, or Post-Review .....	II-10
Exhibit II-5	On-Site Review Phase .....	II-16
Exhibit II-6	Post-Review Phase .....	II-23
Exhibit III-1	Management Review Areas .....	III-1
Exhibit IV-1	System Engineering Review Areas .....	IV-1
Exhibit IV-2	Representative Commercial Data Base Management Systems .....	IV-19
Exhibit IV-3	Data Accounting Packages: Performance Information .....	IV-22
Exhibit IV-4	Benefits of Software Reuse .....	IV-25



## **CHAPTER I: INTRODUCTION**

### **A. BACKGROUND AND OBJECTIVES**

The Department of Health and Human Services' (DHHS) Administration for Children and Families (ACF) provides national leadership and direction in planning, managing, and coordinating the nationwide administration and financing of a broad range of comprehensive and supportive programs for vulnerable children and families. These programs are, in large part, carried out by public and private local agencies and are designed to promote stability, economic security, responsibility, and self-sufficiency.

Despite the fact that the programs are carried out at the state and local levels, ACF retains the responsibility of approving, monitoring, and certifying that the programs are being executed as intended by law and regulation — and that the expenditure of Federal funds is made wisely.

To achieve these goals, ACF regularly reviews systems being planned, developed, implemented, and operated by the States to ensure:

- Effectiveness,
- Efficiency,
- Economy,
- Portability and Transferability,
- Quality, and
- Financial integrity.

The reviews are conducted by teams of ACF central office (CO) and/or regional office (RO) staff in cooperation with the States.

The objectives of this Information Systems Review Guide are to:

- Set forth standard guidance for conducting information systems reviews over the major phases of large scale systems development efforts;
- Cover information systems review objectives in all phases of system life cycle development, implementation, and operation;
- Provide guidance to ACF CO and RO staff on scoping and conducting systems reviews;
- Provide information to the States on the review process and potential scope of

reviews; and

- Set forth detailed questionnaires for the review and analysis of systems.

## **B. AUTHORITY**

The origin of the programs overseen and financed by DHHS/ACF is the Social Security Act. Included under ACF's scope of review authority are:

Title IV-A: Aid to Families with Dependent Children  
Title IV-A: Child Care (JOBS, TCC, and At Risk)  
Title IV-B: Child Welfare Services  
Title IV-D: Child Support Enforcement  
Title IV-E: Foster Care and Adoptive Services  
Title IV-F: Job Opportunities and Basic Skills (JOBS)

The State systems activities for these programs are managed and reviewed in accordance with rules codified in the Code of Federal Regulations (CFR), especially:

45 CFR Part 95, Subpart A: Sets a two-year limit (15 months in some cases) for a State to claim Federal financial participation (FFP) in expenditures under State plans approved for certain titles of the Social Security Act.

45 CFR Part 95, Subpart F: Specifies the conditions for FFP in the cost of acquiring data processing equipment and services under an approved State plan; sets forth the approval and reporting processes of the Advance Planning Document (APD) and Advance Planning Document Updates (APDUs); provides an exemption to the capitalization and depreciation provisions of Subpart G for ADP equipment; requires access by ACF to all aspects of State systems; and sets States' responsibilities for ADP security. Authorizes under section 95.621 the Department to conduct "periodic on-site surveys and reviews of State and local agency ADP methods and practices."

45 CFR Part 95, Subpart G: Prescribes requirements concerning the computation of claims for FFP in the cost of equipment under public assistance programs.

45 CFR Part 205.35 to 205.38: Provides guidance for the development of an automated AFDC Statewide management information system, eligible for enhanced funding.

45 CFR Part 250, Subpart I: Governs State uniform data collection requirements, data system options, and required case record data.

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45 CFR Part 307: Governs enhanced funding for the acquisition and operation of comprehensive, statewide Child Support Enforcement systems.

45 CFR Part 74, Subpart D: Establishes retention requirements and access rights for programmatic, financial, statistical, and other types of records pertinent to grants.

45 CFR Part 74, Subpart G: Contains rules for satisfying Federal requirements for cost sharing or matching.

45 CFR Part 74, Subparts O and P: Set forth provisions for the procurement and property management of supplies, equipment, or services acquired or matched in part or whole with Federal funds.

The Office of Management and Budget (OMB) has issued requirements which relate to grants with State and local Governments, including:

OMB Circular A-87: Establishes principles and standards for determining costs applicable to grants, contracts, and other agreements with State and local governments.

OMB Circular A-102, Attachment O: Sets standards and guidelines for the procurement of equipment, supplies, and services for Federal assistance programs. (Included in 45 CFR Part 74 as Appendix G.)

OMB Circular A-128: Establishes audit requirements for State and local governments that receive Federal aid, and defines Federal responsibilities for implementing and monitoring those requirements. (Included in 45 CFR Part 74 as Appendix J.)

## **C. AUDIENCE**

This Information Systems Review Guide is intended to aid review team members from ACF central office and the regional offices in planning, scoping, and conducting reviews of State information systems.

The Guide is also planned to be of use to State personnel and their consultants and contractors working on Federally-assisted programs' information systems. In this way, the States will be aware in advance of areas of review and focus by Federal oversight personnel. Further, State systems can be planned, designed, and implemented with the review guide's objectives in mind.

## **D. HOW TO USE THIS GUIDE**

**Who.** This guide will be used by Federal review personnel from central office and regional offices. This guide is optional for State use in preparing for reviews.

**When.** The Information Systems Review Guide will be used by ACF to conduct systems reviews. It will be used to plan the review, set review objectives, and conduct the review. States may also use the document as a source of information during the development and implementation of State systems.

**Where.** The guide will be used during pre-review and post-review in ACF central and regional offices and on-site at the States.

**How.** The Information Systems Review Guide is intended to be a review aid for experienced, professional review analysts. In that sense, comprehensive guidance explaining "why" a question is pertinent is not required. Of more significant aid to such personnel is a consistent approach to the universe of questions that can be applied in an information systems review. The Guide represents that universe of questions from which a review is planned and executed.

The Information Systems Review Guide contains prepared questions for the review, to make efficient use of reviewer time and to ensure complete and consistent system coverage in the review. The review analyst's job is to select the questions that apply to a given review. (For example, most operations and maintenance questions will not apply to a system which is still in development.)

These questions are guides. Review professionals should select, supplement, or modify them with observations and queries based on his or her own professional judgement and technical experience. Since the questions provided are aimed at a broad range of systems, the reviewer will determine what is relevant to the system under review and may choose to eliminate or substitute more pertinent questions.

This guide may be used alone, or in concert with program-specific guides, such as the IV-D certification guide.

**Why.** The Information Systems Review Guide provides standardized guidelines for conducting information systems reviews over the system life cycle. It provides guidance to ACF central and regional office staff on scoping and conducting systems reviews, to help the State identify potential problems and provide assistance, if possible, to correct those problems. The Guide may also be of benefit to State personnel by providing information on the Federal review process and potential scope of systems reviews.

The document provides a consistent methodology for reviewing systems development over the life cycle from planning to operation and maintenance. The Information Systems Review Guide may be used, when necessary, in tandem with program-specific guidance.

**What.** The guide is divided into four chapters and seven appendices. Chapter I is the introduction. The remainder of the guide contains the following information.

- Chapter II provides a functional overview of the information system review process. The methodology and structure of the reviews, including the products generated by the reviews are discussed in Chapter II.
- Chapter III contains an overview of the management areas to be reviewed.
- Chapter IV is an overview of the systems engineering areas to be reviewed.

Chapters III and IV reference respective appendices which are designed to be the base operational guides for review team members to use in conducting on-site interviews. The questions contained in Appendices C and D are presented in work sheet format. In many cases they have been phrased in a way that "no" answers in an area may require further attention. Reviewers should consider the questions to be open-ended if the response warrants.

Appendices A, B, and E respectively provide aids to the reviewers and team leader including sample letters used during the review process; sample finding summary worksheet; and a sample report outline for documents produced during the State systems review. Appendix F contains reproducible review worksheets. Appendix G provides a form to be used in evaluating this guide.

## **E. TYPES OF REVIEW**

Several types of reviews are conducted on Federally-assisted State systems, categorized as compliance, certification, and recertification. (See the Table on the following page.)

Compliance reviews are often conducted earlier in the systems development life cycle than the certification review. These reviews emphasize compliance with Federal regulations and directives, frequently with a focus on project management, financial management, and the State's APD process. The review can also consider critical

### **EXHIBIT I-1**

#### **TYPES OF REVIEWS CONDUCTED ON STATE SYSTEMS**

<b>Type of Review</b>	<b>Description of Review</b>
Compliance:	Compliance reviews are broad-based reviews which may

	include evaluation of management, financial, and technical aspects of the system development project. These reviews may be conducted to assure conformance with an approved APD or they may be more broadly scoped to insure the system is in compliance with Federal regulations and directives and that the system meets the goals and objectives of ACF.
Certification Level 1:	Level 1 certification reviews determine that the system software meets the functional requirements of the applicable Federal programs. Level 1 certification does not require the system to be in operation statewide.
Certification Level 2:	Level 2 certification reviews require a system to meet the level 1 software functionality and also to conform to all other Federal requirements. In order for a system to be certified, it must be in operation statewide.
Recertification:	Follow-up reviews are conducted periodically to ensure continued conformance with the functional requirements specified by the applicable program's regulations.

technical design factors — such as designing code for transportability — which is easily corrected early in the process, but expensive and difficult to correct later.

Certification reviews are focused on specific program requirements and are essential to ensure full Federal funding of State programs up to statutory limitations. These program-focused reviews are often conducted in tandem with compliance reviews.

Through this approach, ACF confirms that key elements of a successful systems development and implementation effort are in place — such as capacity measurement, projection, and planning, which ensure that adequate resources are on-line when the new system goes up.

This guide sets forth an approach and body of questions which can be used in information systems reviews, regardless of type and scope. During the conduct of a certification review, this guide will be used in association with program-specific guidance.

## **F. OVERVIEW OF SYSTEM REVIEW AREAS**

This review guide concentrates on two broad areas of focus within an information systems review:

- Management



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- System Engineering

These areas of focus concentrate the review on the management functions which direct and control the information system over its life cycle, as well as the technical aspects of the system itself. (See Exhibit I-2 on the following page.)

Since failure in either area may result ultimately in systems failure, cost overages, or loss of Federal matching funds, the need for reviewing both areas is evident.

The potential benefits of review will vary widely depending on the stage of development or operation of the system.

For example, a review early in the life cycle of a new system could help to bring management attention to bear on the realities of long term operations and maintenance obligations of such information systems or to help designers evaluate the open systems opportunities which might exist for a new system.

On the other hand, a mature system may benefit from a revised system description which is readable by program and management staff or from recommendations for modifications to improve systems effectiveness.

Examples of benefits which could accrue include:

Management Benefits:

- Compliance with program and user objectives;
- Potential cost savings through system modification, re-engineering, or process simplification;

**EXHIBIT I-2**

- Planning for and surviving disaster;
- Higher recognition of operations and maintenance functions and resource requirements;
- Continuity of systems support and management through effective systems documentation; and
- Improved system development and operation through improved user / operator / manager communications.

System Engineering Benefits:

- Assessment of potential system modifications;
- Improvement in productivity of design;
- Improvement in efficiency of design;
- Determination of projected system life;
- Evaluation of open systems environment (OSE) opportunities; and
- Determination of specific hardware/software dependencies.

Chapters III and IV address in greater detail the management and systems engineering review process. Chapter II, following, provides a functional overview of the review process.





## CHAPTER II. FUNCTIONAL OVERVIEW OF THE REVIEW PROCESS

This chapter provides a functional overview and methodology of the review process to be followed by central and regional office ACF personnel when conducting reviews at the States. The methodology will apply regardless of the program being reviewed — such as IV-A or IV-D — and regardless of the type of review — such as compliance or certification — being conducted.

This methodology discusses review initiation, the areas to be reviewed, the schedule of the review, and the products which will be generated as an outcome of the review. The chart below shows the overall schema for the review. As can be seen, the review has four phases: review initiation, pre-review, on-site review, and post-review. The majority of the time and activity is focused in the pre-review and post-review phases, thereby minimizing the time and disruption to State personnel.

### EXHIBIT II-1

#### INFORMATION SYSTEM REVIEW METHODOLOGY

REVIEW INITIATION	PRE-REVIEW PHASE	ON-SITE REVIEW PHASE	POST-REVIEW PHASE
<ul style="list-style-type: none"><li>· Select System for Review</li><li>· Designate Team</li><li>· Schedule Review</li><li>· Plan Reporting</li><li>· Estimate review's costs and benefits</li></ul>	<ul style="list-style-type: none"><li>· Review Documents</li><li>· Notify State</li><li>· Identify Initial Findings</li><li>· Scope Review and Objectives</li><li>· Draft Agenda</li><li>· Conduct Conference Call</li><li>· Finalize Notice with State</li></ul>	<ul style="list-style-type: none"><li>· Conduct Entrance Conference</li><li>· Review System Documentation</li><li>· Conduct Interviews</li><li>· View System Operations</li><li>· Document Findings</li><li>· Coordinate Findings</li><li>· Notify CO and RO Management</li><li>· Conduct Exit Briefing</li></ul>	<ul style="list-style-type: none"><li>· Provide Preliminary Assessment</li><li>· Conduct Conference Call</li><li>· Conclude Assessments</li><li>· Finalize Findings &amp; Conclusions</li><li>· Prepare Report</li><li>· Notify State</li><li>· Follow-up</li></ul>

#### A. REVIEW INITIATION

Systems review functions, regardless of type, are always affected by resource constraints: there are simply not enough review professionals to perform systems life cycle reviews of

all State systems at all key points during their development. Therefore, ACF managers at both the CO and RO level need to carefully select and prioritize the information systems which they will review.

Although the need to conduct reviews is, in some cases, determined by statute — such as the need to review and certify systems at implementation to support enhanced Federal funding — generally, the earlier in a system's life cycle of development the review is conducted, the more likely the review will positively affect and influence the system's potential for success.

In selecting and prioritizing systems, CO and RO managers should apply standard criteria. Systems which meet several of these criteria may take a higher priority for review. Criteria include the following:

- State has requested system certification.
- Advance Planning Document (APD) submissions or other information sources indicate there may be a problem in terms of cost, schedule, contract performance, or project strategy.
- System is due for an annual compliance review, as required by law.
- The system is nearing a major project milestone, such as writing the system software or pilot testing the system.
- New priorities have developed to improve or enhance functions or services which are supported by the information system.
- The information system's function(s) are duplicated by other more efficient State systems.
- New system development efforts may affect existing systems.
- Potential cost savings or avoidance may be possible through integration, modification, or simplification of the information system.
- Age of the system (older operating systems and/or systems in implementation or planning) may be causing or expected to cause performance problems.
- The system may have cross-organizational impact or potential for multi-State use.
- The system may generate high operations and maintenance costs.

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- The system may have potential to contribute to more effective mission accomplishment.
  - Changes to Federal and/or State law may have a major impact on the system.
  - The system is not meeting user requirements or expectations.
  - Complaints have been made concerning system performance.

Central and regional office managers will select the systems to be reviewed at least in part using the criteria above. The criteria will be identified to the selected review team (see paragraph 1 below) and will become a part of the review's objectives. If, for example, the APD process indicates continuing failure to meet system milestones and repeated schedule slippages, one objective of the review would be to determine why the State is unable to stay within schedule and what the team can recommend to correct the problem.

The key events and activities of the review initiation phase are detailed on the following page in Exhibit II-2.

## **1. Designate Team**

Conducting information systems reviews requires substantial time commitments from individuals with high levels of program and system expertise. Development of the review products will require thorough understanding of the system under review and the manner in which the program's functional requirements will be met. Such understanding and professional evaluation can only be efficiently obtained by a team whose expertise and background are tailored to the particular system being reviewed.

Once a system is identified for review, the review team and team leader must be selected with consideration of the following:

- Representation of both central and regional offices, where appropriate;
- Adequate number of personnel to conduct the review within the time constraints;
- Appropriate mix of skills; and

## EXHIBIT II-2

### INFORMATION SYSTEM REVIEW METHODOLOGY

#### REVIEW INITIATION

Event	Select System for Review	Designate Team	Schedule Review	Plan Reporting Estimate Costs and Benefits
Action	<ul style="list-style-type: none"><li>· Receive State request, or</li><li>· Select systems at CO or RO level</li></ul>	<ul style="list-style-type: none"><li>· Select Team Leader</li><li>· Select Team Members</li></ul>	<ul style="list-style-type: none"><li>· Draft schedule for review</li></ul>	<ul style="list-style-type: none"><li>· Identify milestones for plan reporting</li><li>· Estimate review's costs and benefits</li></ul>
Detail	<ul style="list-style-type: none"><li>· Consider priority selection criteria</li><li>· Consider available resources</li><li>· Use criteria for selection to form initial review objectives</li></ul>	<ul style="list-style-type: none"><li>· Assure CO and RO representation, if possible</li><li>· Provide adequate number of personnel on team</li><li>· Select appropriate skill mix for review</li><li>· Assure effective project leadership</li></ul>	<ul style="list-style-type: none"><li>· Initiate first team conference call</li><li>· Outline tasks, times, and milestones</li><li>· Assign responsibilities</li><li>· Set firm dates for completion of the final report and project end-date</li></ul>	<ul style="list-style-type: none"><li>· Identify when reports to management are required</li><li>· Identify when approval from management is required</li><li>· Include in schedule</li><li>· Estimate the probable cost of the review</li><li>· Define the projected benefits</li></ul>



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- Project leadership selected on the basis of interpersonal skills, project management skills, and writing ability.

**Representation:** Generally speaking, regional offices have lead responsibility for recertification reviews. Central Office has lead responsibility for certification and compliance reviews.

**Number:** The total number of personnel on a review team varies, depending on the size and scope of the review, the personnel available from both central and regional offices, and the number required to obtain the required skill mix. Generally, however, review teams will range in size from three to eight, with five or six as the optimum for efficient review.

**Skill mix:** Review team members are required, because of the nature of the job, to be skilled and knowledgeable in a variety of subject areas and tasks. For example, review teams are usually composed of systems analysts, policy or program analysts, and financial auditors. The skill mix varies depending on the review. For example, a review conducted very early in the planning process may not require the participation of a financial auditor.

In addition to this broad mix of skills, more specific knowledge may be required depending on the objectives of the review. For example, a review's preliminary objectives may identify a need to review systems security, the continued validity of the State's initial cost/benefit determination, or plans for database conversion. In that case, analysts with knowledge and skills in those particular skill areas will be required.

**Project Leadership:** The project or team leader is critical to the success of the review and should be selected on the basis of ability to effectively manage and work with diverse skill groups; proven ability to complete projects on time; demonstrated experience in working with peers, subordinates, and higher level management; and skills in writing. During the review, the team leader is responsible for:

- Ensuring timely and open communications with State personnel, team members, and CO and RO management;
- Responding to any State request for information;
- Identifying tasks, assigning responsibilities, and evaluating preparedness of all team members (both CO and RO representatives);
- Coordinating all regional activities through the senior regional team member;
- Assuring proper substantiating documentation of all review findings and the related conclusions and recommendations;

- Approving or disapproving findings for inclusion in the team's report; and
- Taking the lead in the entrance and exit conferences and in all negotiations with the State.

## **2. Schedule Review and Plan Reporting**

After the review team has been designated, a meeting or conference call should be set up by the team leader to plan the review schedule. The schedule should outline specific tasks, times, milestones, and assigned responsibilities. Milestones should include key points for management reporting and approval.

Depending on the size and complexity of the system being reviewed, the resources available, and the scope of the review, the elapsed time of the review from start to finish may be from three to six months. Most reviews should be completed in four months or less.

Although the initial schedule may be modified somewhat as the review progresses — particularly considering the need to coordinate an appropriate time for on-site work — the schedule should include firm dates for completion of the final report and project end-date. This allows RO and CO management to effectively plan the allocation of limited resources to other projects and forces a discipline on the team to conclude the review in a timely fashion.

## **3. Estimate Review Costs and Benefits**

The review initiation phase should include a preliminary estimate of how much the review will cost, in terms of staff salary, travel, and other costs, and a description of the benefits to be derived from the review, such as fulfilling mandatory legislative and regulatory requirements, reducing system operating costs, or improving user efficiency and effectiveness.

## **B. PRE-REVIEW PHASE AND PRELIMINARY EVALUATION**

The purpose of the pre-review and preliminary evaluation is to complete as much review and analysis as possible before going on-site. This objective has three purposes:

- To support the review staff by thorough preparation, which enhances staff knowledgeability and professionalism;
- To limit the time and expense of on-site work for both Federal and State personnel; and

- 
- To maximize the effectiveness of on-site performance.

The pre-review phase should be completed within two months. Key events and activities of this phase are detailed in Exhibit II-3 on the following page.

## **1. Analyze Documentation, Existing and Required**

The team leader, together with the assistance of the team members, must quickly identify readily available sources of information about the system in question. If a review is being conducted jointly with a regional office, the team leader may want to assign a regional team leader as his or her "second" on the review team.

Documents which are likely to be readily available to the team are:

- APD documents, including planning APDs, implementation APDs, and APD updates (annual or as needed);
- Documents submitted to fulfill the "prior written" approval requirements of 45 CFR 95.611, including Requests for Proposal (RFPs), contracts, and contract modifications and amendments;
- Reports and supporting documentation from previous reviews;
- Quarterly project status reports;
- Systems documents submitted by the State with the request for certification;
- ADP System Security Review Reports submitted in accordance with 45 CFR Part 95.621; and
- Any other pertinent documents submitted by the State to either the central or regional offices.

The review team members should work to clarify their general understanding of the system through their review of system documentation during the pre-review phase. If the system is using or will use new technologies with which the team technical members are not familiar, technical research should be immediately initiated. Further, if required, the review team should begin to prepare test data for on-site systems verification.

### EXHIBIT II-3

#### INFORMATION SYSTEM REVIEW METHODOLOGY: PRE-REVIEW PHASE

Event	Review Documents	Scope Review and Objectives	Draft Agenda for On-site Review	Ready Team and Prepare Final Notice to State
<b>Action</b>	<ul style="list-style-type: none"> <li>Review documentation</li> <li>Notify State</li> </ul>	<ul style="list-style-type: none"> <li>Identify initial findings / concerns</li> <li>Scope review and objectives</li> </ul>	<ul style="list-style-type: none"> <li>Prepare agenda for on-site review</li> </ul>	<ul style="list-style-type: none"> <li>Conduct final team conference call</li> <li>Notify State</li> </ul>
<b>Detail</b>	<ul style="list-style-type: none"> <li>Locate and analyze existing CO and RO documentation to prepare for on-site</li> <li>Prepare test data, if necessary</li> <li>Notify State by letter of review and request additional information</li> <li>Review additional documentation</li> </ul>	<ul style="list-style-type: none"> <li>Call conference to identify team's initial findings and concerns</li> <li>Determine scope: who, what, where, when, why, and how</li> <li>Set objectives</li> <li>Select specific management and system engineering criteria</li> <li>Get management approval</li> </ul>	<ul style="list-style-type: none"> <li>Develop agenda to achieve review scope and objectives</li> <li>Coordinate with State as required</li> <li>Develop detailed agenda for team use, specifying assigned tasks and team meetings</li> <li>Get management approval</li> </ul>	<ul style="list-style-type: none"> <li>Ensure team members have review scope, objectives, agenda, and schedules.</li> <li>Ensure each team member is prepared to fulfill assigned tasks on-site</li> <li>Plan entrance conference</li> <li>Finalize on-site review plan with State</li> <li>Prepare entrance letter with agenda</li> </ul>

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Team members can identify other documents to request by reviewing the questions in the management and system review areas, Chapters 3 and 4 and Appendices C and D. See also Exhibit II-4 on the following page.

As directed by the team leader, team members should review the documents, identifying preliminary concerns, findings, and additional needed information. For example, progress reports may indicate a history of milestone slippages, suggesting that the systems design has serious project management or resources problems. Team members should keep in mind that review of the documentation, in concert with the information generated on-site in the interviews, will provide the majority of the evidence for the review report.

At the conclusion of the team members' reviews, the team leader should initiate a conference call. All team members should present the results of their evaluations and needs for further information, which the team leader will consolidate. The outcome of this stage of the review should be the team's consensus on:

- Preliminary concerns or findings, and
- A list of additional information required of the State.

## **2. Provide Preliminary Notice to State**

The team leader should draft a letter providing, as appropriate, either preliminary notice of the review or acknowledgement of the State's request for certification. The letter should:

- Provide a list of additional documentation which must be submitted by the State,
- Suggest a timeframe for on-site review, and
- Identify the team leader assigned to the project.

States should be given at least 45 days notice, if possible. A copy of a sample notification letter is included in Appendix A. A copy should be sent to the Director, Office of Information Systems Management, Administration for Children and Families, *if the review will be conducted by regional personnel alone.*

Examples of additional information which can be requested are listed in Exhibit II-4 on the following page.

## EXHIBIT II-4

### ADDITIONAL INFORMATION THAT MAY BE REQUIRED:

#### PRE-REVIEW, ON-SITE REVIEW, OR POST-REVIEW

Management Documents	Systems Engineering Documents
<p>..... State plan and system goals</p> <p>..... System implementation schedule</p> <p>..... Project management plan</p> <p>..... Requests for Proposal</p> <p>..... Related contracts and agreements</p> <p>..... Staffing and organization charts</p> <p>..... Telephone book</p> <p>..... Cost allocation plan</p> <p>..... Cost allocation procedures</p> <p>..... Security plans</p> <p>..... Security policies and procedures</p> <p>..... Contingency and backup plan</p> <p>..... Disaster recovery test results</p> <p>..... Results of last security review</p> <p>..... Configuration Management procedures</p> <p>..... Change Control procedures</p> <p>..... Conversion Plan</p> <p>..... Test Management Plan</p> <p>..... Facilities Management Plan</p> <p>..... Site Preparation Plan</p> <p>..... Installation Plan</p> <p>..... Test and Validation Plan</p> <p>..... Users' manuals</p> <p>..... Training Plan</p> <p>..... Post-Implementation Test Plan</p> <p>..... Three-Year Configuration Plan</p> <p>.....</p>	<p>..... List of hardware and software</p> <p>..... System narrative</p> <p>..... Functional specification</p> <p>..... Information flow charts</p> <p>..... System flow charts</p> <p>..... Design documents</p> <p>..... Interfaces with other systems</p> <p>..... List of application programs</p> <p>..... Schema listing for database</p> <p>..... Data element dictionary</p> <p>..... Edit definitions</p> <p>..... Systems reference manual</p> <p>..... Copies of input/output forms</p> <p>..... Origination sources of input</p> <p>..... List of reports and outputs</p> <p>..... Destination sources of output</p> <p>..... Copies of production data</p> <p>..... Copies of production reports</p> <p>..... User acceptance agreement</p> <p>..... User procedures manual</p> <p>..... Training manual</p> <p>..... System operations reports</p> <p>..... Performance and capacity measurement reports</p> <p>..... Trouble logs</p> <p>..... Standards manuals</p> <p>..... Glossary of terms, acronyms, and symbols</p> <p>..... Error recovery procedures</p>

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### 3. Review Additional Documentation

As soon as the additional information is received from the State, the team leader should disseminate it for review. To the extent possible, team members should review all written documentation when received and prior to the on-site visit. During review, each team member should update the list of initial concerns, findings, and review objectives as appropriate.

If the State has not agreed to a time for on-site review, the team leader should initiate contact with the State to finalize the review schedule.

### 4. Identify Preliminary Findings or Concerns

Following the conclusion of team review, a conference call initiated by the team leader will consolidate the team members' efforts. The review should have a set of preliminary findings or concerns to be addressed during the review. Depending on the results of the on-site and post-review process, these initial findings may be further developed, modified, or eliminated.

### 5. Scope Review and Set Objectives

One of the most important phases of any review is the phase during which the scope and objectives of the review are set. After all, reviews are resource-intensive efforts involving a nearly overwhelming body of information. To cope with and manage the review in a limited time, reviewers need to remain focused on the review's scope and objectives.

This is not to say that a reviewer cannot change review scope and objectives based on findings during the on-site review. Indeed, the reviewer should, but only if the new line of inquiry fits within the general authority of the review being conducted and is approved by central or regional management as a change to the previously approved scope.

In order to accomplish this phase, the team leader should document the review's scope, objectives, and schedule — building on information and lines of inquiry developed by the team during pre-review. The scope should define:

- **What** information system will be reviewed;
- **Who** the team must meet with during the on-site review — including State program management, systems development and data center staff, and fiscal personnel, as well as key contractor personnel working on the systems effort;
- **Where** the review will take place, for example, both State level and selected county or district systems — and for reviews including certification assessment, with one

representative of each component of the respective program (for example, prosecuting attorneys and clerks of the court for applicable Child Support Enforcement Systems);

- **When** the review will be conducted, consistent with the original schedule and with State agreement;
- **Why** the review will be conducted, in terms of mission and objectives; and
- **How** the review will be conducted, in terms of tasks, responsibilities, milestones, deliverables, and schedules.

Following this general scoping, the team must identify the specific management and systems engineering criteria for focus. A general discussion of the criteria appear in Chapters 3 and 4 of this guide. Specific questions representing a "universe" of systems review criteria are included in Appendices C and D.

It is the responsibility of the team leader and members, as experienced review professionals, to determine which questions are applicable and pertinent to a given review and to assign responsibility for those questions to specific team members. For example, a review conducted shortly after the State's submission of a planning APD will have few, if any, systems implementation questions — except perhaps in terms of planning for implementation.

It is also the responsibility of the review team to develop questions specific to the review at hand if needed. The collective experience of the team is as valuable a resource as any handbook or guide.

Following development, the review scope and objectives should be submitted by the team leader to management for approval.

## **6. Draft On-Site Agenda**

Following the approval of the review scope and objectives, the team leader, with the participation of team members, should draft the on-site agenda consistent with the review's scope and objectives.

Considerable coordination with the State will be necessary to complete the agenda. The team leader should be the focal point for all communications with the State. Details which should be discussed with State officials by the team leader include assuring that:

- Timing of the on-site is acceptable to both parties;



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- The full on-site inspection (and testing, if any) can be completed in a single visit;
  - All resources (including human), information, and operational system capability will be in place and available for the on-site review;
  - Working space is available at all sites, suitable for team meetings, interviews, and desk work;
  - County or local sites to be inspected have been selected in concert with State personnel and notified of the impending on-site review; and
  - State officials understand the review process and their roles and responsibilities within the process.

The team leader should develop the agenda in two levels of detail:

- A general one-page agenda which will be provided to the State and serve as a daily schedule guide; and
- A detailed agenda for use by team members, breaking out specific assignments, tasks, and team-only meetings.

The agenda should be approved by management. If the review will be conducted solely by a regional office team, a copy of the agenda and information on the review's scope and objectives should be sent to the Director, Office of Information Systems Management, Administration for Children and Families, prior to the review.

In addition, at this time the team leader should plan with the team members how the entrance conference at the State will be conducted and what will be covered. The emphasis should be on opening up a line of communication that flows both ways. The State should be advised in general terms of the team's areas of interest. However, the team should not emphasize preliminary concerns or findings that may prove unsubstantiated during the on-site review.

## **7. Conduct Conference Call with Review Team**

This is the last team conference call before the on-site review. The team leader should ensure that:

- All team members have received copies of the review scope, objectives, schedule, and agenda;
- Team members are aware of and prepared to fulfill their assigned tasks during the

on-site review; and

- Especially that the team is prepared, in terms of content and presentation, for the entrance conference.

## **8. Finalize On-Site Review Arrangements with State**

At this time the team leader should arrange any final details by telephone with State personnel. As soon as possible after completion of the agenda and the team's final conference call, the team leader should prepare an entrance letter for the State. The letter should:

- Briefly describe the purpose of the review;
- Identify the team leader, team members, and their areas of expertise;
- Confirm the date and time for the entrance conference; and
- Enclose a copy of the agenda.

Depending on the amount of time available, the information may be mailed, faxed, or hand delivered. A sample letter is included in Appendix A.

## **C. ON-SITE REVIEW PHASE**

The on-site review phase is an intense, three to five day effort, conducted at State and local government sites. The review focuses on both management and systems engineering (technical) aspects, with the emphasis dependent on the stage of the system in its life cycle development. For example, the closer the system is to implementation and operation, the more emphasis will be placed on systems engineering. The earlier in the project, the more emphasis will be placed on management considerations.

Team members will employ a wide variety of techniques to verify whether the State is meeting all the requirements of the law, regulations, and guidelines through the planned or operational system. These techniques may include:

- Conducting interviews covering all areas of the State operation;
- Examining and evaluating documentation;
- Viewing existing operations, planned for replacement;
- Assessing actual production processing (inputs and outputs) of the system;

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- Running test data through the system to verify functionality and accuracy of processing;
  - Sampling randomly-selected case records; and
  - Examining system capacity and performance reports and trouble logs and reports.

Throughout the on-site review, the full team should reconvene at the end of each day to discuss and document the day's findings, summarize results, and refine the next day's plan. The daily meetings are critical to:

- The consensual development of findings,
- The fine-tuning — or refocusing — of the on-site review, and
- Completion of the back-up (substantiating) documentation.

The key events and activities of the on-site review phase are detailed in Exhibit II-5 on the following page.

### **1. Conduct Entrance Conference**

The purpose of the entrance conference is:

- To introduce the team to the State management officials;
- To advise on the nature, scope, and procedures for the on-site inspection;
- To outline the preliminary findings of the pre-review and the focus of the on-site work;
- To request State officials' suggestions and recommendations;
- To confirm the agenda and initial interviews;
- To ascertain who the State has assigned as primary contact for the team; and

## EXHIBIT II-5

### INFORMATION SYSTEM REVIEW METHODOLOGY: ON-SITE REVIEW PHASE

Event	Conduct Entrance Conference	Review System Documentation and View Operations	Conduct On-site Interviews	Document Review Findings	Conduct Exit Conference
<b>Action</b>	<ul style="list-style-type: none"> <li>Meet with State officials</li> </ul>	<ul style="list-style-type: none"> <li>Collect system documentation throughout on-site</li> </ul>	<ul style="list-style-type: none"> <li>Conduct interviews to gather information</li> </ul>	<ul style="list-style-type: none"> <li>Develop consensus on findings</li> </ul>	<ul style="list-style-type: none"> <li>Present findings</li> </ul>
<b>Detail</b>	<ul style="list-style-type: none"> <li>Follow plan</li> <li>Establish open communications</li> <li>Present initial findings</li> <li>Identify other documentation needed</li> <li>Confirm first round of interviews</li> </ul>	<ul style="list-style-type: none"> <li>Review as much as possible on-site</li> <li>Develop and substantiate findings</li> <li>Obtain information as early as possible</li> <li>Prepare before viewing systems, relating questions to review scope, objectives, and initial findings</li> <li>Let State take lead when viewing system operations</li> </ul>	<ul style="list-style-type: none"> <li>Prepare for interviews: develop agenda</li> <li>Relate interview to review scope, objectives, and initial findings</li> <li>Conduct interviews</li> <li>Establish open communications</li> <li>Continue document discovery and review</li> <li>Begin and end on time</li> </ul>	<ul style="list-style-type: none"> <li>Team members develop and support findings throughout review</li> <li>Develop team consensus on findings following critical review</li> <li>Identify positive as well as negative findings</li> <li>Plan exit conference</li> <li>Notify management</li> </ul>	<ul style="list-style-type: none"> <li>Share team's findings</li> <li>Identify areas where review is not complete</li> <li>Encourage open discussion</li> <li>Be prepared to listen</li> <li>Note concerns of State</li> </ul>



- To answer any questions that the State officials may have.

The entrance conference at the State should be conducted in general accord with the plan developed by the team during pre-review. However, the entrance conference should not be simply a presentation by the incoming review team. The emphasis should be on opening up a line of communication that flows both ways.

State officials should be encouraged to indicate areas of the system development effort that deserve attention by the review team. The team should establish *that Federal and State officials have a mutual interest in establishing an open review process dedicated to improving system development and ensuring full Federal funding for the State.*

During the conference, the State should be advised in general terms of the team's areas of interest and of any findings which were well documented and proven during pre-review. However, the team should not emphasize preliminary concerns or findings that may prove unsubstantiated during the on-site review.

## **2. Review System Documentation**

As far as practicable, system documentation should be reviewed during the pre-review phase, or at the latest on-site, since the development of findings later in the week will depend on "backing up" or substantiating the findings.

If not arranged during the pre-review phase, team members should provide their requests for further documentation to the responsible State official as early as possible during the on-site. The request may be that the documentation be furnished as soon as possible or during the conduct of an interview with a State official.

## **3. Interview System Users and Operators**

Much of the on-site work will involve meetings with individuals and small groups of professionals who have expertise in various facets of the information system.

Team members should go into all meetings fully prepared to conduct the interview and gather specific information, related to the review's scope, objectives, and preliminary findings or concerns. Each member responsible for an interview should have a written agenda, shared with the State official, so that the meeting is as productive as possible.

Questions can be used to initiate the interview process, but the reviewer should allow the discussions to follow a more free-form format and elicit professional views and opinions of the State officials on the key issues and problems. Again, the objective should be on two-way communication and the establishment of mutual interest.

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Every attempt should be made to start and finish the meeting on time. Where possible the reviewer should obtain hard copies of work products to support any conclusions or recommendations in the system review report.

#### **4. View System Operations**

If the review is being conducted on a system being tested or in implementation or operation, site visits should be arranged to view system operations. It is acceptable, perhaps preferable, to let State or local government officials take the lead in this phase of the on-site. However, review team members should be prepared with specific questions, as before, related to the review's scope, objectives, and preliminary findings or concerns.

If the visit indicates a potential finding or concern unanticipated by the pre-review, every attempt should be made at the time to clarify and define the situation. The team member will have to gather enough information to determine if the new finding can be substantiated and documented.

#### **5. Document Findings**

Findings are documented throughout the review process using three primary tools:

- The questionnaire forms in Appendix C and D, as marked or edited during the scoping in the pre-review phase;
- The finding summary worksheet form in Appendix B; and
- The matrix of findings form in Appendix B which summarizes the review overall.

**Questionnaire.** Team members should be assigned responsibility for selected portions of the questionnaire forms included in Appendix C and D (as marked or edited during the scoping of the review). When using the forms, the results of each question should be:

- Briefly documented, if the result is a satisfactory conclusion;
- Documented more thoroughly if the result is unsatisfactory and requires further review; and
- Thoroughly substantiated and documented as a potential finding if the response warrants.

Space has been provided for the reviewer to annotate findings on the question sheets in Appendices C and D. Team members should consider that the questions may be or become

open-ended based on the results of the inquiries. Professional judgement should be used.

Team members should place significant effort and emphasis on written evaluations, since this work will ultimately substantiate the review findings and be incorporated in the team's reporting.

**Finding Summary Worksheet.** Each analyst should document findings as the review progresses. For each potential finding, a worksheet (Appendix B) should be developed which documents not only the finding but also:

- The basis for the finding, including criteria, cause, and effect;
- Whether corrective action is underway or planned;
- Whether corrective action is recommended by the team;
- Whether the criticality of the problem could affect Federal system approval and/or funding; and
- Related conclusions and recommendations.

Of these, the basis for the finding is the most critical, because it justifies the finding and sets the foundation for the team's analysis, conclusions, and recommendations. A valid finding has three elements:

- **Criteria** — a description of what should have occurred, such as conformance with a regulation, standard, or acceptable level of performance. The criteria is the standard against which the finding is identified.
- **Cause** — the origin of the problem, which could relate to a resource, procedure, or management deficiency. Identification of the cause will aid in identifying potential recommendations to correct the finding.
- **Effect** — the potential or actual adverse consequence of the finding. Without an adverse effect, a recommendation for correction should not be made.

The purpose of preparing the worksheet is to document and substantiate the findings that have developed during the review process. Documents, interviews, and observations should be referenced and the logic supporting the finding presented — sufficient so that the worksheet would be capable of convincing a third party that the finding is justified and meritorious.

Each team member should develop finding worksheets, working individually or in tandem



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or groups depending on the review and assigned responsibilities. The team members should complete, at a minimum, the sections on the Finding Summary Worksheet for "finding" and "basis for finding." The sections for "corrective action," "criticality," "conclusion," and "recommendation" may be drafted by the team member or developed in team conference. The team must reach consensus on the information in the Finding Summary Worksheet before it is presented orally or in writing to State officials. (See paragraph 6 below.)

An enlarged copy of the worksheet is included in Appendix F for reproduction and use by team members.

**Matrix of Findings.** The matrix of findings form (Appendix B) is begun by the team leader during the team conference (see following paragraph) and completed during the post-review stage when all findings are complete. The matrix uses a three level rating chart, for satisfactory, deficient non-critically, and deficient critically. Critical deficiencies are problems so severe that Federal approval or funding may be affected. There is also a column on the worksheet for comments, such as outstanding aspects or the system's potential for transfer. Note that there are rating charts for both the system engineering and the management areas.

Enlarged copies of the worksheets are included in Appendix F for reproduction and use by the team leader.

## **6. Coordinate Findings in Team Conference**

Prior to the exit conference — on the next-to-the-last or the last day on-site — the team leader and members should hold a team conference to develop consensus on the review findings. The team leader and each team member should critically consider each finding and determine whether the finding has been substantiated well enough for inclusion in the report. Areas of excellence should be noted as well as opportunities for improvement.

The outcome of the meeting should be a consensus on the team's findings and a strategy for presenting the preliminary information in the exit conference with the State. The matrix of findings form (Appendix B) is begun by the team leader, in cooperation with team members during the team conference. The matrix forms and the finding summary worksheets will assist the team in preparing an overview and summary of findings for the exit briefing.

The preparation for the exit briefing is the final step in the team conference. Team members should prepare their approach to the exit conference including the following:

- General remarks as to the progress of the review;
- Acknowledgement of the assistance of State personnel;

- A summary of findings, indicating their preliminary nature;
- An indication of the areas of the review yet to be completed (and their schedule) in the post-review process; and
- An invitation for comments from State officials.

## **7. Notify RO and CO Management**

Prior to the exit conference, the team leader (and regional team leader, if assigned) should notify management of the summary of findings to be presented at the exit conference — following procedures and meeting levels of detail required by their supervisors.

## **8. Conduct Exit Conference**

The purpose of the exit conference is to share, to the extent possible, the preliminary findings of the review team. Since some review work will conclude during the post-review phase — particularly when test data are run on systems in the test, implementation, or operational phases — the team leader should emphasize that the findings are preliminary and that work is not yet complete in certain functional areas. The team leader should also emphasize that the exit conference is to share information, not initiate a debate. If the State wants to dispute a preliminary finding, additional information may be submitted within the following two-week period for the team's consideration.

The team should make a point of sharing the preliminary findings, because:

- The State will be given the opportunity to present additional information not previously provided the team which could affect the merit of the finding;
- The State will not be surprised by the final report;
- The State can begin corrective actions, if necessary; and
- The team tests the validity of the finding before committing it to a report.

The team should take particular care with extremely negative findings that could affect Federal approval or funding. The team must be very critical of its own efforts, subjecting such findings to counter-argument and testing the extent of substantiation within the group before presenting the preliminary finding to Federal management officials or to State officials.

## **D. POST-REVIEW PHASE**

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During the post-review phase, management is provided with a preliminary assessment of the State system; team assessments are concluded; findings and conclusions are finalized; and the report is prepared.

It is critical during post-review that the team leader maintain a sense of urgency about concluding the review effort and ensure team performance within the scheduled timeframe.

The key events and activities of the on-site review phase are detailed in Exhibit II-6 on the following page.

### **1. Provide Management with Preliminary Assessment**

Within one week (five working days) after the day of the exit conference, the team leader and regional team leader (if assigned) are to provide to management a preliminary assessment of the review. The assessment should be based on the overview and findings approved by team consensus and presented to State officials.

The State's reaction to the exit conference should also be included. For example, based on the team's findings, the State may plan immediate corrective action. Or, the State may have presented countering information to a preliminary finding, convincing the team that the finding should be reconsidered or withdrawn.

### **2. Conduct Conference Call**

The team leader should initiate a team conference call to ensure that all team members are completing assigned tasks and are committed to the scheduled timeframe.

## EXHIBIT II-6

### INFORMATION SYSTEM REVIEW METHODOLOGY: POST-REVIEW PHASE

Event	Conclude Assessments	Finalize Findings and Conclusions	Prepare Report	Notify State Follow-up
<b>Action</b>	<ul style="list-style-type: none"> <li>· Advise management</li> <li>· Conclude assessments</li> </ul>	<ul style="list-style-type: none"> <li>· Develop consensus on findings and conclusions</li> </ul>	<ul style="list-style-type: none"> <li>· Write report</li> </ul>	<ul style="list-style-type: none"> <li>· Notify State</li> <li>· Follow-up</li> </ul>
<b>Detail</b>	<ul style="list-style-type: none"> <li>· Provide preliminary assessment to management</li> <li>· Conduct conference call</li> <li>· Conclude final review and analysis</li> <li>· Develop additional findings and conclusions as warranted</li> </ul>	<ul style="list-style-type: none"> <li>· Conduct final team conference call</li> <li>· Achieve consensus on complete body of findings and conclusions</li> <li>· Assign segments of report for writing</li> <li>· Determine if follow-up is required</li> <li>· Require copies of all documents</li> <li>· Conclude matrix of findings forms</li> </ul>	<ul style="list-style-type: none"> <li>· Complete report within 60 days after on-site</li> <li>· Note areas of excellence as well as opportunities for improvement</li> <li>· Emphasize findings, conclusions, and recommendations: limit extra information</li> <li>· Specify required follow-up</li> <li>· Get management approval</li> <li>· Send to ACF Washington for issuance</li> </ul>	<ul style="list-style-type: none"> <li>· Send report to State</li> <li>· Commit resources and schedule follow-up as necessary</li> <li>· Identify lessons learned</li> </ul>



### 3. Conclude Team Assessments

The team should conclude all additional documentation review and analysis as soon as possible after the on-site review, developing additional findings and conclusions as warranted.

### 4. Finalize Findings and Conclusions

The team leader initiates a final team conference call, achieving consensus on the complete body of findings and conclusions that will form the basis of the report. The conference call should not be completed until the team leader has:

- Assigned segments of the report for writing (if part will be delegated),
- Assured that team members are aware of the remaining project due dates,
- Determined with the team whether follow-up is warranted on the review, and
- Required copies of all documentation.

The matrix of findings forms (Appendix B), begun by the team leader during the final on-site team conference, are completed during this phase.

### 5. Prepare Report

The team leader is responsible for completion of the team's report by the scheduled milestone, normally within 60 days after completion of the on-site work. Areas of excellence should be noted as well as opportunities for improvement.

The goal should be to produce a report which concisely summarizes the review effort and focuses on findings, conclusions, and recommendations of the team.

The report should be organized into four major sections, one of which is optional:

- **Executive Summary.** Provides a brief (normally six pages or less) summary of the review, indicating the purpose of the review but focusing on and summarizing the review's findings, conclusions, and recommendations.
- **Introduction.** Establishes the background, purpose of the review, scope of the review, and review methodology.
- **Findings, Conclusions, and Recommendations.** The "meat" of the report which outlines each finding, the basis for the finding, corrective actions underway (if any),

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as well as a conclusion and recommendation for each finding.

- **Follow-Up (optional)**. This section may be used if follow-up is required as the result of a review, either by State officials, Federal officials, or both.

As is evident, the report should emphasize findings, conclusions, and recommendations. Each finding should be concisely stated, clearly set apart in the text, and followed by a brief discussion of the "basis for finding" and an indication whether corrective action is underway. Conclusions and recommendations should directly relate to and be supported by the findings.

If follow-up is warranted, the report should specify:

- What follow-up actions are required,
- By what organization, and
- When.

The amount of background information written for the report should be strictly limited, as it can negatively affect the team's productivity. If it is necessary to include additional information, appendices may be used. For example, appendices may be warranted for:

- List of Review Participants,
- On-Site Agenda,
- State's Project Organization Staff,
- System Overview, and
- Summary of Federal Funding.

Most of the appendices would require little time to prepare. The exception is the system overview, written to document the architecture, general information flow, organizational relationships, functions, and events scheduling. The information flows and other data in the report should be verified by the review team with the system manager before the appendix is drafted.

Because of the time required to develop it, the ultimate usefulness of this appendix should be carefully evaluated before it is written. For example, the time and expense involved in preparation of the system overview would pay off if:

- The system will be reviewed again and the information will save time for the next review team, or
- The system is a good candidate for transfer and adaptation for another State's use.

After the report is written, it must be approved by regional and central office management,

*even if the review has been conducted using only regional personnel. All reports on State systems are issued by the Director, Office of Information Systems Management, Administration for Children and Families, to ensure a consistent, national approach.*

See Appendix E for recommended report and appendices outlines.

## **6. Notify State**

After the report is written and approved by central and regional office management, a copy is sent to the State's Department head under cover letter signed by the Director, Office of Information Systems Management, Administration for Children and Families. If the report has identified a requirement for follow-up, it should be highlighted in the cover letter as well. See Appendix A for a sample letter which includes copy dissemination information.

## **7. Follow-Up**

A review is not over until all follow-up actions are completed and verified by the review team or team leader. Such actions should be scheduled and resources committed by management for follow-up.

Follow-up should also include the team's critical assessment of the review. For example, was the review conducted within the time and costs projected during the initiation of the project? Were anticipated benefits achieved? What were the "lessons learned" which will be of benefit to future reviews and other review teams?



## CHAPTER III: MANAGEMENT REVIEW AREAS

This chapter describes the management review portion of an information systems review. There are five specific review areas, representing management functions related to the life cycle of a system, in which detailed evaluations are performed. These are:

- ..... A. ..Mission and Planning,
- ..... B. ..Development,
- ..... C. ..Implementation,
- ..... D. ..Operations and Maintenance, and
- ..... E. ..Cross-Cutting Activities.

Each of the five review areas is presented in a similar format. The format includes the objectives and elements of evaluation included in each review area. Detailed questions to be used in conducting evaluations associated with each review area are contained in Appendix C. Exhibit III-1 summarizes the component parts of each of the five management review areas which will be discussed in this chapter.

**EXHIBIT III-1**

Management Review Areas				
Mission and Planning	Development	Implementation	Operations and Maintenance	Cross-Cutting Activities
<ul style="list-style-type: none"> <li>· Requirements Conformance</li> <li>· Current Environment</li> <li>· Project Planning</li> <li>· Future Planning</li> </ul>	<ul style="list-style-type: none"> <li>· Life Cycle Management Methodology</li> <li>· Design Environment</li> <li>· Development Environment</li> <li>· Documents and Reviews</li> <li>· Development Organization</li> </ul>	<ul style="list-style-type: none"> <li>· Data Conversion</li> <li>· Installation</li> <li>· Testing</li> <li>· Users and Training</li> <li>· Post-Implementation</li> </ul>	<ul style="list-style-type: none"> <li>· Resource Utilization</li> <li>· Operating Environment</li> <li>· Efficiency/Reliability</li> <li>· System/ Organizational Management</li> </ul>	<ul style="list-style-type: none"> <li>· Security</li> <li>· Cost/ Benefit</li> <li>· Internal Controls</li> <li>· Strategic Systems Management</li> <li>· System Audit</li> <li>· Financial Management</li> </ul>

## **A. MISSION AND PLANNING**

The main objectives of this review area are to determine the relationship of the planned or operational system to its mission and current environment; assure that it remains a viable system in terms of mission requirements; evaluate project planning; and ascertain whether the system is postured to serve and respond to future mission requirements.

Specifically, the intent of the review is to determine whether the various levels of system management are attentive to and in control of, in a management sense, the past, present and future impacts of mission changes on system functioning and responsiveness. The review will also determine whether management planning will support an effective systems development and implementation effort.

The elements of evaluation included in the mission and planning portion of the management review include:

1. Requirements Conformance - which focuses on determining whether the mission and objectives of the system have been clearly delineated, whether the systems development effort is monitored against the original goals and objectives, and whether the system will easily adapt to changes over time;
2. Current Environment - which focuses on how well the current system is meeting the requirements of today's mission in order to serve as a basis for evaluating alternatives and measuring improvements through system development and which considers whether measures have been taken to simplify and streamline current work processes;
3. Project Planning - which focuses on how well the system development life cycle is being planned and managed and which addresses the APD process, contracting for resources, and project management; and
4. Future Planning - which focuses on whether plans for later stages in the systems development project are initiated in sufficient time to ensure smooth development and implementation and which is concerned with developing systems which can respond to changes or new technology without undue disruption.

Although this section will be emphasized more for systems still early in their development life cycle, the reviewer must ascertain which sections and specific questions in Appendix C to cover for each review. For example, portions of project planning and future planning will apply to virtually any systems review.

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## B. DEVELOPMENT

The broad objective of this portion of the management review is to determine the appropriateness and effectiveness of activities used in designing and developing the system. This includes evaluating the life cycle management methodology used, assessing the design and development environment, considering whether or not the developing organization and environment produced adequate documentation and reviews of system activities, and evaluating the development organization itself.

The elements of evaluation included in the development portion of the management review include:

1. Life Cycle Management Methodology - which focuses on determining whether a recognized LCM methodology will be (or was) used in the design and development of the system and whether the methodology includes a mission needs analysis and option design, analysis, and selection before actual system design is attempted;
2. Design Environment - which is concerned with determining the effectiveness of the design process and whether adequate thought and planning have been devoted to this phase of the systems project.
3. Development Environment - which identifies the software and system development tools and techniques used in system development; assesses whether or not development is properly managed and supported; and considers whether planning is preparing for ensuing phases;
4. Documentation and Reviews - which focuses on assessing the quality, timeliness and comprehensiveness of documentation produced as well as the quality of management and technical reviews conducted during system design and development; and
5. Development Organization - which focuses on evaluating both the adequacy of the organization and whether or not the organization possesses the required functions and skills for designing and developing the system.

This management review area should be stressed for systems that are either currently under development or have recently been completed and released for implementation. On the other hand, if systems have been operational for some time, it may make little sense to determine how well the system design and development was managed.

The reviewer must make judgements, mostly dependent on the stage of the system in its life cycle, about the relative levels of emphasis given to this portion of the management review. Decisions on coverage should be made down to the question level in Appendix C.

## **C. IMPLEMENTATION**

This phase is concerned with the actual implementation of the system, beginning with data conversion and including installation, testing, and training. A system cannot be implemented unless sufficient resources — space, human, data, computer capacity, etc. — are in place at the necessary time. The implementation phase also considers tests run against the pilot system before full system change-over is initiated. It also deals with obtaining user acceptance on the performance aspects of the system as well as ensuring that all users are properly trained. And it ensures that management conducts a post-implementation review to assure that the system is performing as intended.

The elements of evaluation included in the implementation portion of the management review include:

1. Data Conversion - which considers how the conversion effort has been planned for and implemented;
2. Installation - which focuses on the preparation for, implementation of, and acceptance of the system by management and users;
3. Testing - which focuses on testing the pilot production system using test data prior to widespread installation;
4. Users and Training - which considers whether Users' Manuals have been completed, evaluated, and accepted by users and whether user training has been completed and provided for over the systems life.
5. Post-Implementation Review - which considers whether the State has concluded an operational systems test, final approval of Users' Manuals, and preparation of the three year configuration plan.

This review area should be stressed for those systems which are in design, development, or implementation. This part of the review, however, should also be used for evaluating the quality of planning for system implementation that may be evident in documentation produced for new systems under development. The reviewer should consider the phases and questions and select those appropriate for the review at hand.

## **D. OPERATIONS AND MAINTENANCE**

Major objectives of this portion of the management review include evaluating whether the system's operations and maintenance are well managed and whether the system possesses adequate resources and a supportive organizational structure.

There are four areas included in this portion of the management review, including:

1. Resource Utilization - which assesses the level of resource commitments in terms of dollars, people, software, hardware, data and information, and contracts;
2. Operating Environment - which focuses on evaluating the management of the surroundings and environmental factors associated with operations and maintenance;
3. Efficiency/Reliability - which assures the existence and appropriateness of functions and activities in place to compile data concerning how resources are spent to maintain and operate the system; and
4. System/Organizational Management - which focuses on reviewing the system's management functions and evaluating their adequacy as related to their role in such activities as configuration and performance management, workload distribution, training and development, user support, data integrity, security, and quality management.

This review area should be stressed for those systems which have completed design and development activities and which will soon be or have been released to the staff and organization who will operate and maintain them. This part of the review, however, should also be used for evaluating the quality of planning for operations and maintenance that may be evident in documentation produced for new systems under development. The reviewer must selectively determine which sections and questions to ask during the review.

## **E. CROSS-CUTTING ACTIVITIES**

The objective of this portion of the management review is to determine the level of planning and management associated with various peripheral areas which may impact system effectiveness. The areas for evaluation involve either externally imposed programs (for example, Federally-imposed standards for security) or internally defined programs (for example, internal controls) to ensure system control and consistency.

The major cross-cutting activities include the following:

1. Security - which focuses on evaluating the security program and processes in place for guarding against fraud, waste, and abuse and on the State's proactive management of risk and vulnerability;

2. Cost/Benefit - which assesses the application of cost/benefit considerations by management in determining system feasibility, selecting alternatives, and evaluating projected against actual system performance; and which requires consideration of recurring, non-recurring, and non-cost factors (some of which may apply to more than one category, such as training, which may be both a recurring and non-recurring cost);
3. Internal Controls - which evaluates the level of attention accorded the development of system checks and balances to ensure system integrity;
4. Strategic Systems Management - which assesses the extent to which the system is managed strategically, achieving controlled growth and evolution with technology;
5. System Audit - which targets the system's auditability and evaluates previous system audits or reviews as well as their intent and findings; and
6. Financial Management - which focuses on evaluating the financial management aspects — accounting management, payment receipts, and distribution — of the information system to determine if Federal requirements are met.

More than any other area, cross-cutting activities can apply throughout the life cycle of systems development and implementation. These activities also can be most subject to change, as external and internal policies, regulations, and procedures are issued and updated. Reviewers should consider the cross-cutting activities throughout the life cycle, with consideration of whether external or internal changes affect the review at hand.

Appendix C covers the management review areas, presented in matrix and hypertext format. Reviewers should select and adapt the information to the review being planned or in process.

## IV. SYSTEM ENGINEERING AND ARCHITECTURAL REVIEW

This chapter explains in detail the systems engineering and architectural review portion of an information system review. There are five specific review areas in which detailed evaluations are performed. These are:

- ..... A. ..System Effectiveness
- ..... B. ..User Interface
- ..... C. ..Maintainability
- ..... D. ..System Attributes
- ..... E. ..System Efficiency

Each review area is presented in a similar format, which sets out the objectives and elements of evaluation for each review aspect. Details are provided in this chapter about the technical aspects of systems engineering and the basis for the review focus to aid reviewers. Generally speaking, the systems engineering review is applied to systems nearing implementation or in operation. Reviewers should selectively apply the sections and questions which are meaningful to the review in process.

Exhibit IV-1 below summarizes the component parts of each of the five system engineering review areas which will be discussed in this chapter. Detailed questions to be used in conducting evaluations associated with each review area are contained in Appendix D.

**EXHIBIT IV-1**

System Engineering Review Areas				
System Effectiveness	User Interface	Maintainability	System Attributes	System Efficiency
<ul style="list-style-type: none"> <li>· ..... Perceived Validity</li> <li>· ..... Requirements Conformance</li> <li>· ..... System Availability</li> <li>· ..... Data Refreshment</li> </ul>	<ul style="list-style-type: none"> <li>· ..... User Profile</li> <li>· ..... General Interface</li> <li>· ..... User Documents</li> <li>· ..... User Support</li> <li>· ..... System Privacy</li> </ul>	<ul style="list-style-type: none"> <li>· ..... System Environment</li> <li>· ..... System Documentation</li> <li>· ..... Maintenance Action Types</li> <li>· ..... Code Quality</li> <li>· ..... Survivability</li> </ul>	<ul style="list-style-type: none"> <li>· ..... Configuration Management</li> <li>· ..... Telecommunications</li> <li>· ..... CASE Tool Usage</li> <li>· ..... Data Base Management</li> <li>· ..... Portability</li> </ul>	<ul style="list-style-type: none"> <li>· ..... Software Efficiency</li> <li>· ..... Hardware Efficiency</li> <li>· ..... Hardware Inventory</li> <li>· ..... Efficiency Reporting</li> <li>· ..... Technical Opportunities</li> </ul>

## **A...SYSTEM EFFECTIVENESS**

The primary purpose of this portion of the information system review is to confirm the system's effectiveness in terms of validity, documentation, maintenance, availability, refreshment, and usefulness. The objective in evaluating its usefulness is to validate and verify the system. Boehm summarizes the distinction between the two terms as:

.....· ... Validation - Is the organization building the right product?

.....· ... Verification - Is the organization building the product right?

The system effectiveness review focuses on validating and verifying the system. Validating the system is accomplished by evaluating goals, objectives, and systems life documentation and interviewing the operational system users to determine if the *right product* was built. Users perceive the system as valid if it provides information which is useful, accurate, and timely.

Verification of whether the system was *built right* is accomplished by comparing system performance to the goals, objectives, and requirements specifications. As further verification, the number of corrective maintenance actions performed on the system should be reviewed.

In this part of the review, the system's availability and data refreshment activities should be evaluated as important aspects of system effectiveness.

Therefore, system effectiveness is comprised of four areas for review:

- .....· .... Perceived Validity
- .....· .... Requirements Conformance
- .....· .... System Availability
- .....· .... Data Refreshment

### **1. ..Perceived Validity**

For this evaluation, the reviewer should interview a representative cross-section of the user community, including management staff. A comprehensive set of interviews should provide the reviewer with the data to make an evaluation of perceived validity as an essential aspect of system effectiveness.



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## **2.. Requirements Conformance**

In this section, reviewers consider "system requirements documents," a generic term used to describe the documents developed during the system development life cycle based on the understandings of the system developers and system users. Documents may be referred to as the mission needs analysis, the functional requirements, or some other comparable name.

However named, the objective of this assessment is to compare the formally stated goals of the system with the reality of the system's achievements. A poorly managed development or modification process may result in a system which fails to meet the original requirements. Therefore, system performance should be compared with the system's original objectives. Discrepancies should be noted, evaluated, and either accepted or corrected. Any changes should be formally recorded.

Typically the system requirements are presented in two forms. The first is a non-technical, natural language description of the needs as described by the potential users and management. The second is a more technical description of system specifications used by the developers who contracted for the system development. While reviewing the system, both sets of documentation should be referenced.

Non-functional as well as functional requirements should be surveyed. Non-functional requirements include parameters such as processing speed, response time, and system size. If non-functional requirements were not explicitly defined, the reviewer can establish an impression of the system's non-functional requirements through conversations with user and maintenance personnel.

## **3.. System Availability**

System availability for on-line systems is defined as the proportion of time the system is available to the user during normal working hours. If the system is a batch system, availability is the on-time delivery of scheduled output reports.

System availability can be affected by hardware downtime or software failures. Reduced availability due to hardware can be determined from computer center, performance management, or maintenance logs. Software induced downtime may be less obvious. If the system "crashes" because of a software failure, it often can be restarted with a caution to the users to avoid the circumstance causing the crash until maintenance staff attempt to correct it.

The important issue for the review is to establish if the system's availability is affecting users' abilities to perform their responsibilities. If availability is a concern, the reviewer should further identify the basis for the system's lack of availability.

## **4. .. Data Refreshment**

The objective in assessing the data refreshment cycle is to confirm that the system is providing information to the user that is current and timely. Some systems are real time and are updated "on the fly." Others require periodic data refreshment that may include a system shutdown to refresh the database. The key issue for the review is to verify that the data presented to the user is sufficiently current.

## **B..USER INTERFACE**

The overall effectiveness of an information system can be measured by how well the system provides information to the user. In the system effectiveness review area above, the reviewer determined the system's adequacy by surveying the perceived validity of system effectiveness, how well the system conformed to the stated specifications, and so forth. In this section, the effectiveness focus will be on how easy the system is to use.

The information system is another tool which the system user has to accomplish his or her job. A valid requirement of the tool is that it is easily operated. That is, the system should be easy to use and difficult to misuse. The mechanics of using the system should not be obtrusive but should allow the user to focus on functional problems.

To evaluate the user interface, the reviewer should survey the following areas:

- .....· .... User Profile
- .....· .... General Interface
- .....· .... User Documentation
- .....· .... User Support
- .....· .... System Privacy

Because this review guidance is general in scope, the reviewer may find that some of the descriptive paragraphs and questions posed for interface evaluation may not be relevant to the system being reviewed. As is true throughout this guide, reviewers should select, modify, and expand questions to suit the review in process.

### **1. ..User Profile**

System designers should be cognizant of the qualifications of those who will use the system. If the system is interactive, sophisticated users may prefer a command-based system where the system is activated by entering commands. This type of system provides the greatest flexibility and speed — and with its power, more room for error. Therefore, it may be advisable for less sophisticated users to have a menu driven system where it is virtually impossible or of little consequence to make erroneous entries.

Another interface consideration is whether system users are read-only or read/write users. Read-only users are those who only retrieve data from the system while read/write users also input or update system information.

The reviewer should analyze the system-related characteristics of the user community to understand the interface requirement parameters. To do so, the reviewer should first develop a user profile. Factors such as education level and computer experience influence how the user interface should be designed. The effectiveness of the interface must be evaluated with respect to the user profile. If there is more than one type of user, the reviewer may need to repeat the task at various levels.

## **2.. General Interface**

User interface has a significant effect on productivity. It is also the yardstick by which a user evaluates the effectiveness of a system. A system which is difficult to use will result in a high proportion of user errors. Poorly designed interfaces can cause a user to make potentially devastating mistakes.

Good interface design centers on the needs and abilities of the users. A good system will employ terms familiar to the user and will parallel the environment in which the user operates. The procedures to operate the system or obtain data should be consistent across subsystems.

Quality measures of input/output are a function of the input/output device and media. The following paragraphs address the more common types of system interface. The reviewer must evaluate how effective the system interface is in light of user characteristics and the system operations performed.

Video display terminals are rapidly becoming a common means for communication with an automated information system. In time VDTs will account for the majority of user interface procedures. Newer, well designed video interfaces employ pointers with windows, icons, and menus. These systems are usually easier to use for both the novice and experienced user. The "point and pick" interface is less intimidating to the inexperienced user who can learn to communicate with a system after a brief training period.

Currently, the menu type interface system is the most routinely used system for custom built applications. It is easy to program and has the advantage that the user need not remember commands. Input typing is minimal and it is more difficult to input faulty data. However, the menu system is less effective if many choices are available. For experienced users, menu driven systems are sometimes awkward and slow.

Command driven interfaces require that the user supply commands to the computer system.

The system responds by completing the specific tasks it is commanded to execute. This type of system is not appropriate for the non-technical user because it involves learning a command language which can be complex. Also command type interfaces allow a user to issue potentially catastrophic directions.

On-line help is a major advantage in an interactive system interface. Help systems can be quite comprehensive, but very complex to program and implement. If the system is complex and has many inexperienced users, a robust help system can be cost beneficial.

The final areas the reviewer should consider when evaluating an interactive video system are error messages and the use of color. Error messages should be polite, concise, consistent, and constructive. The users' background and experience should be considered in the design of error messages. Lengthy error messages will wear on a user very quickly. A well designed error message suggests how the user is to recover the situation.

The cost of color terminals has declined dramatically in recent years. Most all new personal computer systems include color monitors. Researchers agree that color is the most important factor influencing speed and accuracy of terminal use. However, color is extremely easy to misuse. For screen evaluations, the reviewer's first impression of color use in screen displays is probably valid.

### **3. User Documentation**

The documentation provided to the system user is most often the first contact the user will have with a system. It is important that user documentation provide an accurate and comprehensive description of the system. User documentation may reside in several documents or in one volume. Regardless of the format, it should contain, as a minimum, the following information:

- .....· ....A functional description explaining the capabilities of the system;
- .....· ....An introductory section explaining the basic requirements for using the system;
- .....· ....A reference guide which describes in detail what capabilities are available and how to use them; and
- .....· ....A system administrator's guide providing instructions for performing housekeeping tasks, such as data retirement or responses to unusual situations.

The functional description should be a high level document, without complex details, outlining the purpose of the system. It should describe what the system can do and cannot do. Examples should be used wherever appropriate.

The introductory section should provide the user with sufficient information to start using the system and obtain information. Again, examples are helpful. If the system under review is interactive, the introductory manual must describe how to get out of trouble when things go wrong.

The system reference manual is the definitive description of system usage. Two equally important characteristics of the reference material are:

- .....Completeness of the information, and
- .....Completeness of the index to the information.

A robust system reference and index is essential to a system user. An easy-to-find and easy-to-use listing of all error messages is an important indicator of the completeness of the information.

If the users' responsibilities include functions like system backup or error resolution, a system administrator's guide should be provided. The guide should further define messages produced by the system and the user action required.

If the system is interactive, the most effective user documentation is on-line. The reviewer can quickly evaluate on-line help and error resolution by accessing the system.

When evaluating user documentation, reviewers should consider:

- .....Documentation inventory,
- .....Documentation quality, and
- .....Documentation accessibility.

An inventory of documentation assures that users can quickly identify and locate the needed documentation. Further, current inventories support more than system maintainability. They also play a role in backup and survivability functions, by ensuring that complete sets of documentation are maintained off-site.

Quality considerations ensure that the documentation is worth using, supporting users in their jobs. Well organized, well written, and well maintained documentation allows users to quickly identify, locate, and resolve system problems.

Accessibility considers whether users have easy access to current system documentation.

#### **4. User Support**

Information systems can provide information to users on all five staffing levels of an

organization, including the executive, managerial, technical, administrative, and clerical levels — as well as to users outside of an organization, such as the public, legislature, Federal agencies, and independent auditors. The form and the amount of support required at each level are dependent upon the scope and complexity of the system as well as the experience of the users. During the review of the user support area, the reviewer should focus on determining the extent and effectiveness of user training and user technical assistance.

**User Training.** Training the users is a critical element for the effective operation of an information system. To provide the training required by the user, a variety of training options are available, including classroom instruction, computer assisted training, training manuals, and individual instruction. The type of training which is most effective depends on the system, the system users, and the resources available.

The responsibility of the reviewer in this area is to evaluate the training function in relation to the system being reviewed. For example, is the training pertinent to the users' functions?

Executive and manager training should emphasize the payback from a management perspective. Administrative user training should center on job accomplishment.

In addition to training perspective and content, the reviewer should verify that training is performed frequently enough to accommodate new system users and system changes. Training facilities and training aids should be evaluated.

Feedback from the training experience is essential. The reviewer should confirm that the organization has procedures that evaluate the success of training with respect to the users' job capability and performance.

**Technical Assistance.** Users are confronted with a wide variety of complex hardware and software and may require assistance with work stations, networks, operating systems, databases, or application software. The more that system users are geographically disbursed, the greater the need for formal technical assistance.

The most common form of technical assistance is the "help desk," where users can obtain technical support. An effective help desk function frees the user to do his or her job rather than cope with technical problems. Reviewers should recognize that help desk functions may be formally chartered — or they may be informal and unchartered. Help is frequently provided by a more experienced user in a locale to less experienced users. While this is often effective, if the help function consumes too much time of the experienced user, his or her job may begin to suffer. This may be an indication that technical assistance, and possibly training, is inadequate.

Alternatives to the help desk include hot line telephone support or broadly chartered user support organizations. Systems may even have bulletin boards which function as a clearinghouse for disseminating helpful information on common problem areas.

Help desk and hot line support organizations can provide excellent feedback to the system maintenance personnel and the training staff. Maintaining help logs can clearly identify system anomalies and training weaknesses. The reviewer should assess technical assistance procedures, observe help desk operations, and interview system users to assess the technical assistance area and the feedback process.

## **5. System Privacy/Sensitive Information**

Systems developed, maintained, and operated by States on programs monitored and funded by ACF are typically computerized systems containing personal and sensitive information. These systems require adequate safeguards to ensure data security and confidentiality and to protect against fraud and misappropriation. This portion of the review is intended to take a narrow look at the user interface and access to personal or sensitive information.

In dealing with the user interface, the reviewer should survey system security from the viewpoint of protecting private and sensitive information. That is, users should only be allowed access, via the interface, to data for which they have a need and for which they have been cleared. Further, the organization should be structured in a way that assures appropriate separation of duties and checks and balances. If observed, reviewers should attempt to bring immediate attention to any potential security or access problems observed during the review.

Broader focused security reviews are covered in the cross-cutting section of the management review area.

## **C. MAINTAINABILITY**

Maintainability is defined as the ease with which a system can be understood and modified. Designing systems for ease of maintenance is cost effective. Researchers estimate that software maintenance may amount to two to three times development costs — and consume as much as two-thirds of the total life-cycle costs.

The National Institute of Standards and Technology (NIST), in its publication, "Guidance on Software Maintenance," indicates that the primary problem in software maintenance is the requirement to maintain old, outdated, and *poorly documented* systems.

Given that the maintenance staff has an adequate environment to perform system maintenance, the key factor becomes how easily programs can be understood by maintainers. Understanding is a function of the documentation available, the quality of the source code, and the type of maintenance required.

The task in this section is to review how well and how easily the maintenance function is

being performed. The evaluation should be made by reviewing the following five areas:

- .... System Environment
- .... System Documentation
- .... Maintenance Action Types
- .... Code Quality
- .... Survivability

The reviewer should approach the maintainability review as if responsible for the system. That is, the reviewer should actually look at and evaluate the documentation and code, if possible. Further insight should be gained by speaking with those performing system maintenance.

## **1. System Environment**

The system engineering review of the system environment will consider the hardware and software environments as well as the operational environment. The reviewer should be concerned with the technical capacity and age of the system platform, as well as the capability and currency of program and system software.

Operational environment considerations include personnel and facilities. The review should be concerned with the numbers, technical levels, and stability of the maintenance staff. For example, a critical situation could exist if the "corporate memory" resides in a few individuals who may be near retirement. With regard to facilities, the reviewer should determine whether appropriate resources are available — such as systems manuals and source program libraries — and whether convenient access is provided.

Reviewers should note that although some consideration of tools is included in this section, the adequacy of the tools provided to the maintenance staff is considered more fully under the Attributes/CASE tools section of the systems engineering review.

## **2. System Documentation**

This part of the review assesses documentation from the viewpoint of the system maintenance and operations staff — as opposed to the users' viewpoint, evaluated in the preceding section.

In reviewing system documentation, there are three elements of consideration:

- .... Documentation inventory,
- .... Documentation quality, and
- .... Documentation accessibility.

The documentation inventory should include a level of detail appropriate to the size and



complexity of the system under review. What the document is called is not important, so long as the essence is the same. For example, the Functional Requirements document may be called the Needs Analysis. The reviewer should determine if the documentation produced meets the functions of the documents discussed in this review guide. (See Exhibit II-4 on page II-10 for a list of systems engineering documents.)

The quality and the accessibility of documentation also need to be addressed. Typically, a maintenance staff spends almost half its time understanding the system — the other half divided between implementing and validating changes. It is important that the documentation be well organized, well written, and readily accessible.

### **3. Maintenance Action Types**

The next area under maintainability to be addressed is the system maintenance action process. First, the reviewer will address the maintenance control procedures. Reviewers should note that, if the system is subject to formal configuration control, there will be overlap with the configuration section of the system attributes review area. Nonetheless, the reviewer should examine the existence and adequacy of maintenance action controls.

Three classifications of maintenance actions are generally accepted in the software community. These include:

- .....Perfective Maintenance - Enhancements made to improve software performance, maintainability, or understandability.
- .....Adaptive Maintenance - Modifications made to the system to satisfy or accommodate changes in the processing environment.
- .....Corrective Maintenance - Activities performed to correct design, logic, or coding errors.

Studies indicate that perfective maintenance accounts for about sixty-five percent of the maintenance performed over the systems life. The remaining thirty-five percent is split about evenly between adaptive and corrective maintenance.

Throughout this section the reviewer should note whether, historically, the maintenance control process has captured the type of maintenance performed. If not, the reviewer should estimate the proportion of each maintenance type. The objective is to assess the type, staff hours, costs, and number of maintenance actions performed to support the information system.

Quantifying maintenance action types can provide insight to the health of the system. A continuing level of corrective maintenance actions can indicate that the system is overly

complex and error corrections are introducing other errors.

Reviewers should anticipate that the younger the system, the more corrective maintenance will be performed. As a system matures, the number of corrective actions should show a definite trend downward. If not, it could indicate that the system has "spaghetti" code and the correction of one deficiency introduces other new errors. Speaking with the maintenance staff, the reviewer should determine if the system contains any "black box" code — code no prudent programmer will touch for fear of cascading errors.

The purpose of this part of the review is to evaluate the condition of the information system at the time of review. It is *not* to critique the system developers or programmers, but to identify the need for additional management and programming effort.

The last set of questions in this section, "Recommendation to Restructure," should be addressed only if the maintenance review indicates that the system is seriously flawed.

The National Institute of Science and Technology's Publication 500-106, "Guidance on Software Maintenance," suggests eleven indicators used to determine if a system may be a candidate for redesign. Although these questions may rarely be applied, they are included as a natural part of the systems life of an information system and may be useful in evaluating whether a State system should be a candidate for transfer and adaptation to another State's need. The questions in the matrix reflect general "rules of thumb" to determine if a system may have outlived — or be nearing the end of — its usefulness.

#### **4. Code Quality**

About one-half of a maintenance programmer's time is spent studying the source code of system programs. Maintenance programmers indicate that understanding the intent and style of another programmer's code is the major difficulty in making a change. Many times the only reliable way to understand the system is through the source code itself. Given the above, source code is viewed as the most important element of the system documentation. No matter what other documentation is available, program changes involve understanding the source code.

To evaluate the program code quality, the reviewer will consider five characteristics of the software:

- .... Internal documentation,
- .... Code structure,
- .... Naming conventions,
- .... Programming, and
- .... Source code formatting.

As indicated previously, the most reliable source of information about the program is its source code and comments. If a program is well commented, it is probably well constructed.

Code structure plays an important role in maintainability. Modular construction is the hallmark of well designed and well coded computer programs. Good system architecture apportions code into small self-contained functionally unique components. Modular code is easy to maintain because it is easier to understand functions within the modules as well as interactions between modules.

The names of entities in a computer program should be closely related to, and when practical, identical to the real-world entities they represent. As an example, the code "VEL=DIST/TIME" is much more comprehensible than "A=B/C". Program names provide the reader semantic clues which help to understand what the code is intended to do. The program should contain no anonymous constants. Constants should be named and the program parameter driven.

Good programming is a craft and largely language independent. Programs which are based in software engineering techniques will use structured programming as a foundation. However, the larger the system, the more difficult it is to adhere to strict top down structures. Program modules become more interconnected like a graph than a hierarchical tree structure.

Empirical studies have demonstrated that typographic style or source code formatting significantly affects a reader's code comprehension. The source code format provides visual clues to the program structure. White space and code groupings act as signposts to the reader. Prettyprinters and syntax-directed editors are available and may have been used to format the code under review.

The questions provided the reviewer center on the attributes associated with good programming practice. Many of the questions call for judgmental answers. The sum of the answers to the five areas of questions should provide the reviewer with a comprehensive overview of the code quality.

## **5. Survivability**

In this aspect of the information system review, the technical aspects of the system's survivability are considered. Can the system be efficiently restored if confronted with a disaster?

The Department's policy with respect to automated information system security is to assure, "a level of security that is commensurate with the risk and magnitude of harm that could result from the loss ... " of information contained in the system. In this regard, the reviewer

should recognize that survival planning for a statewide system differs considerably from a plan for a local distributed portion of a system.

The survivability assessment deals with two areas;

- .... System backup/restore provisions, and
- .... System backup/restore documentation.

Back-up provisions are the most fundamental security precautions that can be taken to protect a system. Without back-up there is no recovery (restoration) from disaster. However, the level of effort invested in the back-up function should be cost effective and commensurate with the risk and magnitude of harm that would be suffered through the loss of the system.

In a disaster recovery situation, a blueprint is needed to describe how the system is to be reconstructed and restored. In addition to the application programs and data, other documents would be required. Backup information should be maintained both on-site and off-site.

#### **D. SYSTEM ATTRIBUTES**

In this review section, specific information system attributes will be surveyed. These attributes address how the system is constructed and supported by its environment. The review areas include:

- .... Configuration Management
- .... Telecommunications
- .... CASE Tool Usage
- .... Data Base Management Systems
- .... Portability

The presence or absence of these attributes will depend on the system being reviewed. Some systems may include all of the selected attributes. The objective of this review area is to determine the appropriateness and effectiveness of the attributes employed in the system.

##### **1. Configuration Management**

Software systems, particularly large systems, have long lifetimes — averaging an estimated seven to eight years — and are normally subjected to many changes. Critically important systems are modified to keep pace with changing requirements and changing technology. Asserting and managing control over system change is critical to long-term system effectiveness. An information system should include a designated individual or team

responsible for configuration management functions.

Configuration management is that part of the software management process which develops the procedures and standards for managing the evolving software system. In essence, this area includes:

- .....Configuration management,
- .....Configuration identification, and
- .....Configuration change control.

The review of the configuration management system will address these three areas. Configuration change control is the most important. Control should involve a formal plan appropriate to the size of the system under review.

A configuration baseline should be identified for both the system and the system documentation. Any change to the system should be accompanied by a concurrent change to all affected documentation, with notification of impending change made to the training and user support organizations.

The final review area in this section considers change control and accounting for changes in configuration management.

## **2. Telecommunications**

The object of this review section is to:

- .....Assess current use of telecommunications by the information system,
- .....Ascertain if expanded communications could enhance the system, and
- .....Assess the conformance of current communications systems to an open systems environment.

Although Federal standards are not mandated for State systems, their adoption or the adoption of industry standards is, in many cases, simply good management. The logical requirements for connectivity and information sharing across States argue for the adoption of standards. Good sense argues that existing standards be adopted, as opposed to developing new standards.

Reviewers should note that the broad scope of open system environment issues is dealt with in the Efficiency / Technologies section of the systems engineering review.

Networks are classified as local or wide area networks. Local area networks (LANs) are

characterized by single organization ownership and high data rates and are concentrated in a relatively confined geographic area. Connection among network terminals is coaxial cable or twisted pair wires. In wide area networks (WANs), the users are geographically dispersed. They are connected by existing transmission facilities, such as commercial or dedicated telephone lines.

Many different local area network technologies exist, but the most widely used employ one of three types of network protocols. They are:

- .... CSMA/CD networks (carrier sense multiple access with collision detection),
- .... Token Bus networks, and
- ... Token Ring networks.

CSMA/CD networks, such as Ethernet, allow random access to the communications cable connecting the work stations. If two terminals attempt to send at the same time, a collision occurs and the two immediately stop the transmission. After a "backoff" delay, another attempt is made to use the cable.

The token bus protocols use a single cable, but the sending terminal must wait until a "token" is received before transmitting. Once the transmission is completed, the token is passed to the next station on the cable. The order of token passing among the stations can be logically controlled.

The token ring protocol works in the same manner, except that the token is passed from one station to the next in the physical sequence that the stations are connected to the cable. The advantage to these two protocols is that access to the transmission cable is controlled. Performance remains high even with heavy volumes of traffic. The disadvantage is that the systems are more complex and access is slower because of the architecture.

Wide area networks link widely dispersed users, based on such industry standard protocols as X.25 and ISDN. The connection for WANs is normally commercial telecommunications carriers.

Interconnectivity between LANs or between LANs and WANs is achieved by using bridges and routers. Bridges provide a datalink (layer 2 of the OSI architecture) connection between two LANs using identical protocols. Routers, more complex than bridges, can be used to connect dissimilar LANs and WANs. However, gateways acting as translators between dissimilar network architecture or protocols may be required also. While the bridge or router provides connectivity, the gateway provides interoperability.

More sophisticated networks may incorporate an automated network manager. Network

managers can support a wide variety of services, like analysis to diagnose network problems or monitors to alert work stations when problems arise. Typically, network management products address:

- .....Security Management,
- .....Performance Management,
- .....Accounting (Audit Trail) Management,
- .....Fault Management, and
- .....Configuration Management.

As indicated earlier, the review is concerned with surveying both the current system telecommunications and the potential provided by emerging network technology. The questions suggested in Appendix D can be used as a broad guide for reviewing telecommunications. More specific questions may be developed by the reviewer based on the use or potential use of telecommunications technologies.

### **3. CASE Tool Usage**

Computer-aided software engineering (CASE) tools are automated support tools designed to improve the productivity of the software engineer. The concept of computer aided design and development has existed since the first language compiler was developed. But programs to truly exploit the computer's ability to augment the software process have come into prominence only in the last five years.

Originally most CASE tools were designed mainly to support new systems development. Now the trend is toward addressing the maintenance function as well. CASE tools are available for the full spectrum of the software life cycle — planning, design, development, testing, and maintenance — although the majority still focus on the early stages of the cycle. These tools include support for flow diagramming, design analysis, data dictionaries, code generators, and report generators, to name a few.

Fewer CASE tools deal with the maintenance of existing systems. However, it is in the system maintenance, redesign, and reuse areas — which include efforts related to transporting systems — that CASE can furnish the greatest benefits.

On systems developed years ago which have had successive patches and modifications, CASE technology aimed at "design recovery" and module reuse may offer a cost effective alternative to system redevelopment. Essentially, design recovery tools read existing code and translate it into CASE. Once in the CASE environment, all the power of computer-aided software engineering can be brought to bear.

The reviewer should inventory any CASE tools employed in the development or maintenance support of the information system and describe the CASE-supported functions.

If CASE tools are not employed, the review should evaluate whether their adoption would benefit the system in terms of costs or other advantages.

#### 4. Data Base Management Systems

A Data Base Management System (DBMS) is generalized software for implementing and maintaining a computerized database. The DBMS provides an environment intended to be both convenient and efficient to use in retrieving information from and storing information in the databases. The database together with the software form the database system. Commercially available systems have hierarchical, network, or relational structures.

There are few reasons for not using a DBMS when developing an information system. Once established, the time to develop a new application using a DBMS is estimated at one-sixth to one-fourth of that required when using a traditional file system.

Many of the commercially available DBMS products are now available for operation on a wide range of platforms. Another benefit for users is the availability of utility software that allows users to accomplish more with less knowledge about the intricacies of the hardware and software. This gives users flexibility. When database requirements change, most DBMSs allow the database to be restructured without affecting the existing application programs.

There are two sets of questions associated with this section of the review. The first set should be addressed if the system currently uses a DBMS. However, if a DBMS is not part of the system, the reviewer is provided with questions to help evaluate whether a DBMS would be more efficient, effective, and economical for the information system.

Listed below are some of the commercially available DBMS systems. This list is provided for information only and does not imply that ACF recommends or endorses the listed products.

#### EXHIBIT IV-2

Representative Commercial Data Base Management Systems					
Relational		Hierarchical		Network	
Name	Computer	Name	Computer	Name	Computer
ACCENT R	DEC	ADABAS	IBM	CONVERSE	IBM
CIA	APPLE	CDMS	DEC	DBMS	Multiple
CREATE	HP	COGENT	IBM/UNIVAC	DBOMP	IBM
DB2	IBM	DIALOG	IBM	DMS1100	UNIVAC
IDBP	ETHERNET	GIS	IBM	DMS4	HONEYWELL



IDM 500	VAX	IMS	IBM	IDMS	Multiple
MAGNUM	DEC	INFOS	DG	IDP	HONEYWELL
MRDS	HONEYWELL	MUMPS	DEC	IMAGE	HP
ORACLE	Multiple	OASIS	IBM	LADDER	DEC
RELGRAF	PRIME	SCORE	Multiple	MDBS	Z80
RISS	DEC	SYSTEM 2000	Multiple	MIRO-SEED	Z80
SQL/DS	IBM	UNIDATA	CDC	SIR	Multiple

## 5. Portability

All application programs of any size will have some machine, language, and/or operation center dependencies. Moving an operational system from one manufacturer's machine to another manufacturer's increases the difficulty.

Making a thorough evaluation of the portability of a system is a highly technical and lengthy effort, well beyond the intention and scope of this review guide. However, the reviewer can make a broad assessment of system portability with a few basic observations. For example, if a system is coded in a proprietary language, most likely the system is not very portable. On the other hand, if the application is coded in an ANSI standard language, the portability effort may be more practical. Systems written in Ada or the C programming language are more likely portable than those written in Pascal, because most Pascal implementations incorporate a significant number of non-standard features. COBOL and Fortran are somewhere in the middle.

Given an application written in an ANSI standard language, there are programming techniques that increase a system's portability potential. Self-containment is a major characteristic. That is, the programs are modular and machine dependencies are isolated. Non-standard language extensions are avoided.

In this area the reviewer is provided questions that will allow a general review of a system's portability potential.

## E. EFFICIENCY

The review area of system efficiency deals with how well the system operates. The review will address the following five areas:

- .....Software Efficiency
- .....Hardware Efficiency
- .....Hardware Inventory

- .... Efficiency Reporting
- .... Technological Opportunities

The objective of this section is to determine if the efficiency of the system is a serious issue requiring attention. Specifically, the review is to evaluate whether the system's mission goals and objectives are hindered or whether opportunity exists to improve the system. The reasons and remedies for an inefficiently operating system will be left to the system managers.

Although the review deals directly with hardware and software efficiency, the reviewer should bear in mind the overall operational system efficiency. Program failures for any reason result in reruns, increased cost of operation, and lost opportunity cost.

## **1. Software Efficiency**

With the declining cost of hardware, execution efficiency no longer plays the part it did a few years ago, but it should not be ignored. Execution speed still affects the user's perception of the effectiveness of an on-line system. Execution efficiency affects the expense of running an applications program. The greater the application's execution time, the more important program efficiency will be.

By inspecting the application's program code, specifically program data representations, a reviewer can get an indication of software efficiency. For example, in COBOL, the use of COMP-3 (packed decimal) and COMP (binary) in relation to PICTURE (numeric) data definitions indicate the programmer's concern for execution efficiency. The FIXED DECIMAL and BINARY versus the number of display numeric items in a PL/1 program will indicate the efficiency of the code.

However, the best way for the reviewer to evaluate code efficiency is to determine if it has been subjected to code analysis which identifies the major resource consumers in the program. Once identified, the system manager can decide if it is worth fine tuning those areas.

## **2. Hardware Efficiency**

Hardware efficiency is in the purview of the operations staff and has importance to this review only with regard to its effect on the information system. The reviewer should focus on two topics:

- .... The proportion of the hardware system resources used by this information system, and
- .... The controls and tools the operations staff have to ensure the hardware system

operates efficiently.

At a minimum, a major computer center should have a good accounting package to monitor system performance. These products provide a fast and automatic way to identify target programs or components for examination by monitors and to characterize total computer system workloads. Computer accounting data provides indicators and diagnostics. Indicators include information used to regularly observe the system performance. Diagnostics are internal descriptors collected and examined as needed.

The reviewer should obtain copies of the system logs to evaluate the information available to monitor and control hardware efficiency.

Exhibit IV-3 below lists some of the performance information available from accounting data packages.

### EXHIBIT IV-3

#### Data Accounting Packages: Performance Information

Indicators:	
<ul style="list-style-type: none"><li>· Number of Jobs Processed</li><li>· Turnaround Time</li><li>· Throughput Rate</li><li>· Abnormal Job Termination Rate</li></ul>	<ul style="list-style-type: none"><li>· Processor Wait Time</li><li>· Device Wait Time</li><li>· Paging Rate</li><li>· Idle Time</li></ul>
Diagnostics:	
<ul style="list-style-type: none"><li>· System Restarts</li><li>· Down Time</li><li>· File Mounting Times</li><li>· Equipment Errors</li><li>· Operator Errors</li></ul>	<ul style="list-style-type: none"><li>· Processor Activity</li><li>· Device Activity</li><li>· Memory Allocation</li><li>· Disk Allocation</li><li>· File Contentions</li></ul>

### 3. Hardware Inventory

As part of the review process, the review team should obtain or develop an inventory of the hardware currently supporting the information system. The purpose of the inventory is to support an assessment of the adequacy or deficiency of hardware accommodating the information system. The reviewer should note excess equipment as well as needs for additional hardware.

#### **4. Efficiency Reporting**

The efficiency of a computer center is directly proportional to management's awareness and control of the center's activities. However, understanding how a computer system works declines dramatically at each management level above the computer center staff. For effective management of information resources, a regular and continuing information flow about installation performance is needed at the higher organizational levels.

Reports to upper management should be devoid of jargon like ABENDs, EXCPS per CPU second, megabytes of memory, and so forth. Very few high level managers have the interest or knowledge to understand such working terminology. Whenever possible, commonly understood words should be used for management reports.

Reports should be provided periodically and contain consistent data from one period to the next. Graphics showing trends are one of the best ways of communicating performance to management. The primary goal of the report should be to enhance the management perspective of center operations and to support the center's budget, staffing, and procurement requirements.

In this segment of the review, the reviewer should examine the operational staff's methods and procedures for communicating system performance to upper management. Reviewing historical reports should provide an evaluation of report terminology and consistency.

#### **5. Technological Opportunities**

The final section of the information system review deals with potential technological opportunities relative to the system under review. The review team, using their collective technical background, should propose potential refinements to the system available through new technology.

Advances in processor speed, storage capacity, and communications protocols provide areas of potential, as do imaging technology for data entry and retrieval, expert systems to augment help desks, and CD-ROM data storage. The expertise of all review team members should be drawn upon for this section.

Because of the relevance to current and planned ACF initiatives, the review should encompass at least two specific areas of technological opportunity: open systems environment (OSE) and software reuse (transportability).

**Open Systems Environment.** A major data processing objective over the next five to ten years for both government and industry is migration to an open systems environment (OSE). The 1990s will bring a maturation of standards that foster interoperability, portability, and scalability.

Migration to open systems can be seen as a series of decisions made over time. Those decisions should foster the movement of the State's systems away from a reliance on vendor-specific solutions and toward a reliance on industry standard protocols. As such, the migration to open systems will be largely achieved through decisions made on a day-to-day basis, rather than a "grand solution" procurement.

To be effective then, systems management staffs should monitor the development and evolution of industry standards, both formal and de facto, and plan the development and evolution of State systems in tandem with those standards.

Adoption and integration of open systems concepts will provide excellent benefits to governments and the private sector with respect to interoperability and portability. Benefits include the ability to:

- .....Reduce hardware and software costs,
- .....Diminish the effect of proprietary solutions,
- .....Extend hardware and software life,
- .....Maximize vendor competition and innovation,
- .....Reduce cost of system migration, and
- .....Increase system sharing.

In short, the large investment in application systems will be protected and the potential useful life of systems extended.

**Software Reuse/Transportability.** The potential for software reuse spans the life cycle of a software system. Systems in development can use validated specifications, design requirements, testing data, and code segments from previously developed systems. For older systems, reuse of proven system software during the maintenance function is not uncommon.

Reuse of system software can save both time and cost. The National Bureau of Standards (the precursor to NIST) developed SPEC PUB 500-142, "A Management Overview of Software Reuse." It describes many of the benefits derived from software reuse. Exhibit IV-4, the NIST table of accrued software reuse benefits, is shown on the following page.

ACF promotes the transfer of systems between states because of both cost and benefits. Reviewers can consider transferability from two perspectives when assessing information systems design, development, and implementation:

- .....Are any State systems available for transfer to meet the developing State's requirements?

- .... How can a State system be designed, developed, implemented, operated, and maintained to promote its transferability to another State in the future?

If appropriate for the information system review, the reviewer should assess the potential for software reuse and transportability.

#### EXHIBIT IV-4

BENEFITS OF SOFTWARE REUSE	
Economics	Reusing software reduces costs (requirements, design, specification, coding, testing, maintenance and support tools).
Reliability	Reusing software products or components which are known to be reliable reduces the potential of unforeseen errors.
Maintainability	Reusing software products or components which are well-designed and developed for reusability can improve future maintenance efforts.
Quality	Reusing software products or components can contribute to improved software quality and system performance.
Development Time	Reusing software products can reduce the total time needed to develop and implement a software system.
Resources	Reusing available software products allows concentration of resources on improvement of the software products and other analysis work.







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## **APPENDIX A**

### **SAMPLE LETTERS FOR USE DURING SYSTEM REVIEW**

## **Appendix A**

### **Sample Letters for Use During System Review**

This Appendix contains sample letters which the review team may find useful while conducting an information system review.

It is important to establish and maintain both formal and informal communications throughout the review process with various officials involved with the system under review, whether at the Federal central and regional offices or at the State. There are letters to alert officials of the intent to conduct an information system review as well as notification of completion of the system review and dissemination of the report.



## SAMPLE NOTIFICATION LETTER TO STATE

.....[Date] ....

[State Department Head (over system being reviewed)

Address

City, State, Zip]

Subject: Information System Review

Dear \_\_\_\_\_:

In accordance with the Administration for Children and Families (ACF) mission to monitor the development and operation of Federally-funded systems, ACF plans to conduct a review on the \_\_\_\_\_ system during the period from \_\_\_\_\_ to \_\_\_\_\_. The on-site review is projected for the week of \_\_\_\_\_, subject to your agreement. This review will focus on management and system engineering review areas [as well as programmatic functional areas for certification].

This review is being conducted to ensure the system is being planned, developed, implemented, and operated by the State to achieve goals of effectiveness, efficiency, economy, portability, quality, and financial integrity.

In order to provide our review team with the most current information, we are requesting that specific information be provided to us within two weeks. (See Enclosure 1.) We request this information in advance so that our review team will be prepared for the on-site review and, thereby, limit the time and resources required of your staff during the on-site review.

Prior to conducting the review, we would like to offer you the opportunity to provide written comments that may help focus the review process on areas that may be of concern to you. Although purely optional, your insights would be of great value, and any issues or concerns that you identify will be incorporated into the interview and review process.

The team leader for this review is \_\_\_\_\_, who may be reached by telephone on \_\_\_\_\_. Thank you for your assistance.

..... Sincerely,

..... [Director, Office of Information Systems Management or Regional Administrator]

Enclosure

cc: Regional Administrator/ACF or Director, Ofc of Info Systems Mgmt  
..... ACF Program Director (e.g., IV-A, IV-D)

## **SAMPLE NOTIFICATION LETTER TO STATE FOR CERTIFICATION REVIEWS**

.....[Date] ....

[State Official Requesting Certification  
Address  
City, State, Zip]

Subject: Information System Review / Certification Review

Dear \_\_\_\_\_:

In response to your letter dated \_\_\_\_\_, ACF will conduct a review to consider formal Federal certification of the \_\_\_\_\_ system. The review will be conducted during the period from \_\_\_\_\_ to \_\_\_\_\_, with the on-site review projected for the week of \_\_\_\_\_, subject to your agreement. This review will focus on functional areas for certification, as well as management and system engineering review areas.

In order to provide our review team with the most current information, we are requesting that specific information be provided to us within two weeks. (See Enclosure 1.) We request this information in advance so that our review team will be prepared for the on-site review and, thereby, limit the time and resources required of your staff during the on-site review.

Prior to conducting the review, we would like to offer you the opportunity to provide any additional comments that may help focus the review process on areas that may be of concern to you. Although purely optional, your insights would be of great value, and any issues or concerns that you identify will be incorporated into the interview and review process.

The team leader for this review is \_\_\_\_\_, who may be reached by telephone on \_\_\_\_\_.

Thank you for your assistance.

.....  
..... Sincerely,

..... [Director, Office of Information Systems Management or Regional  
Administrator]

Enclosure

cc: Regional Administrator/ACF or Director, Ofc of Info Systems Mgmt  
..... ACF Program Director (e.g., IV-A, IV-D)  
.....

## SAMPLE ENTRANCE LETTER TO STATE

.....[Date] ....

[State Official to whom Notification Letter Was Sent  
Address  
City, State, Zip]

Subject: Information System Review

Dear \_\_\_\_\_:

On \_\_\_\_\_, I wrote to you that the Administration for Children and Families would be conducting a review of your \_\_\_\_\_ system. Since that time, our staffs have been working together to finalize details for the on-site review, which will begin at [time] on [date]. I have enclosed a copy of the team's agenda.

As you know, the purpose of this review is to ensure the system will achieve goals of effectiveness, efficiency, economy, portability, quality, and financial integrity.

During this review, our team plans to [insert general information about review scope and agenda.]

The team assigned to this project includes [team names and areas of expertise, if appropriate].

Thank your staff for the cooperation they have extended to us.

..... Sincerely,

..... [Director, Office of Information Systems Management or Regional  
Administrator]

Enclosure

cc: Regional Administrator/ACF or Director, Ofc of Info Systems Mgmt  
..... Program Director (e.g., IV-A, IV-D)

## **SAMPLE LETTER TO DISTRIBUTE REPORT**

.....[Date] ....

[State Official to whom Notification Letter Was Sent

Address

City, State, Zip]

Subject: Information System Review

Dear \_\_\_\_\_:

On \_\_\_\_\_, a review team from the Administration for Children and Families completed the on-site portion of the \_\_\_\_\_ system review. At that time, our review team conducted an exit conference and highlighted the preliminary findings and conclusions related to our review.

We have now concluded our review and enclose for your information a copy of the systems report for \_\_\_\_\_.

In short, the review team found that [net out results in one paragraph].

Follow-up on this review [is/is not] required. [Add details if follow-up is necessary.]

Please convey my appreciation to your staff for their support and assistance during our system review.

..... Sincerely,

..... [Director, Office of Information Systems Management]

Enclosure

cc: Regional Administrator/ACF

..... ACF Program Director (e.g., IV-A, IV-D)

..... Director, MIS (State)

..... Deputy Director, OFA (if funding is affected)

## **APPENDIX B**

### **SAMPLE FINDING SUMMARY WORKSHEETS**

## **Appendix B**

### **Sample Finding Summary Worksheets**

This Appendix contains sample finding summary worksheets which are produced during the conduct of an Information System Review. The first worksheet is used by each team member to develop and document findings throughout the review. It is also used by the team leader to develop team consensus on a set of findings and related facts, conclusions, and recommendations on which the systems review report will be based.

The next worksheets are the "matrix of findings" worksheets which are begun by the team leader during the final on-site team conference and completed during the post-review phase when all findings are complete. These worksheets help the team:

- ..Form an overall assessment of the system, and
- ..Assist in writing the report.

The matrix uses a three level rating chart, for satisfactory, non-critically deficient, and critically deficient. Critical deficiencies are problems so severe that Federal approval or funding may be affected. Reviewers should note that there is a column for "Reference/Comment." This column can be used to note outstanding features of the system and/or to consider the potential of the system for transfer to other States.

Note that there are rating charts for both the system engineering and the management review areas.

Enlarged reproducible copies of the worksheets are included in Appendix F.

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**FINDING SUMMARY WORKSHEET**

<b>FINDING:</b>	
<b>BASIS FOR FINDING:</b>	
<b>CORRECTIVE ACTION:</b>	
<b>CRITICALITY:</b>	
<b>CONCLUSION:</b>	
<b>RECOMMENDATION:</b>	

**MATRIX OF FINDINGS: MANAGEMENT REVIEW AREAS**

		Satisfactory	Non-Critical Deficiency	Critical Deficiency	Not Applicable	Reference/ Comments
A.	Mission and Planning					
	1. Requirements Conformance					
	2. Current Environment					
	3. Project Planning					
	4. Future Planning					
B.	Development					
	1. Life Cycle Management Methodology					
	2. Design Environment					
	3. Development Environment					
	4. Documentation and Reviews					
	5. Development Organization					
C.	Implementation					
	1. Data Conversion					
	2. Installation					
	3. Testing					
	4. Users and Training					
	5. Post-Implementation					
D.	Operations and Maintenance					
	1. Resource Utilization					
	2. Operating Environment					
	3. Efficiency/Reliability					
	4. System/Organizational Management					
E.	Cross-Cutting Activities					
	1. Security					
	2. Cost/Benefit					
	3. Internal Controls					



4. Strategic Systems Management					
5. System Audit					
6. Financial Management					

**MATRIX OF FINDINGS: SYSTEMS ENGINEERING AND ARCHITECTURAL REVIEW AREAS**

		Satisfactory	Non-Critical Deficiency	Critical Deficiency	Not Applicable	Reference/ Comments
A.	System Effectiveness					
	1. Perceived Validity					
	2. Requirements Conformance					
	3. System Availability					
	4. Data Refreshment					
B.	User Interface					
	1. User Profile					
	2. General Interface					
	3. User Documentation					
	4. User Support					
	5. System Privacy					
C.	Maintainability					
	1. System Environment					
	2. System Documentation					
	3. Maintenance Action Types					
	4. Code Quality					
	5. Survivability					
D.	System Attributes					
	1. Configuration Management					
	2. Telecommunications					
	3. CASE Tool Usage					
	4. Data Base Management Systems					
	5. Portability					

DHHS/ACF Information  
Systems Review Guide

E.	System Efficiency					
	1. Software Efficiency					
	2. Hardware Efficiency					
	3. Hardware Inventory					
	4. Efficiency Reporting					
	5. Technological Opportunities					

## **APPENDIX C**

### **MANAGEMENT REVIEW QUESTIONS**

## Appendix C

### Management Review Questions

This appendix contains the management review matrix guides for use in conducting the management review portion of an Information System Review. The questions are organized according to the management review structure illustrated below.

Management Review Areas				
Mission and Planning	Development	Implementation	Operations and Maintenance	Cross-Cutting Activities
<ul style="list-style-type: none"> <li>· Requirements Conformance</li> <li>· Current Environment</li> <li>· Project Planning</li> <li>· Future Planning</li> </ul>	<ul style="list-style-type: none"> <li>· Life Cycle Management Methodology</li> <li>· Design Environment</li> <li>· Development Environment</li> <li>· Documents and Reviews</li> <li>· Development Organization</li> </ul>	<ul style="list-style-type: none"> <li>· Data Conversion</li> <li>· Installation</li> <li>· Testing</li> <li>· Users and Training</li> <li>· Post-Implementation</li> </ul>	<ul style="list-style-type: none"> <li>· Resource Utilization</li> <li>· Operating Environment</li> <li>· Efficiency/Reliability</li> <li>· System/ Organizational Management</li> </ul>	<ul style="list-style-type: none"> <li>· Security</li> <li>· Cost/ Benefit</li> <li>· Internal Controls</li> <li>· Strategic Systems Management</li> <li>· System Audit</li> <li>· Financial Management</li> </ul>

The sheets are presented in a hypertext format so that the reviewer can easily ascertain which aspect of the review is being undertaken. This is necessitated by the sheer number of questions with which the review team is confronted.

## **APPENDIX D**

# **SYSTEM ENGINEERING AND ARCHITECTURAL REVIEW QUESTIONS**

## Appendix D

### System Engineering and Architectural Review Questions

This appendix contains the system engineering and architectural review interview guide for use in conducting the system engineering portion of an Information System Review. The questions are organized according to the system engineering review structure illustrated below.

System Engineering Review Areas				
System Effectiveness	User Interface	Maintainability	System Attributes	System Efficiency
<ul style="list-style-type: none"><li>· Perceived Validity</li><li>· Requirements Conformance</li><li>· System Availability</li><li>· Data Refreshment</li></ul>	<ul style="list-style-type: none"><li>· User Profile</li><li>· General Interface</li><li>· User Documents</li><li>· User Support</li><li>· System Privacy</li></ul>	<ul style="list-style-type: none"><li>· System Environment</li><li>· System Documentation</li><li>· Maintenance Action Types</li><li>· Code Quality</li><li>· Survivability</li></ul>	<ul style="list-style-type: none"><li>· Configuration Management</li><li>· Telecommunications</li><li>· CASE Tool Usage</li><li>· Data Base Management</li><li>· Portability</li></ul>	<ul style="list-style-type: none"><li>· Software Efficiency</li><li>· Hardware Efficiency</li><li>· Hardware Inventory</li><li>· Efficiency Reporting</li><li>· Technical Opportunities</li></ul>

The sheets are presented in a hypertext format so that the reviewer can easily ascertain which aspect of the review is being undertaken. This is necessitated by the sheer number of questions with which the review team is confronted.

## **APPENDIX E**

### **SAMPLE REPORT OUTLINE**

## **Appendix E**

### **Sample Outlines for System Reports and Appendices**

This Appendix contains sample outlines for the report and appendices which are produced during the conduct of an Information System Review.

The outlines are provided as guidance. The review team may find the need to expand the contents of the reports depending on the actual system being reviewed. However, the team leader should balance the need to document the review against the need to produce a timely report. The goal should be to produce a report which concisely summarizes the review effort and focuses on findings, conclusions, and recommendations of the team.



## Sample Outline for System Report

### .....EXECUTIVE SUMMARY

#### I. ....INTRODUCTION

- .....A. . Background
- .....B. . Purpose of Review
- .....C. . Scope of Review
- .....D. . Review Methodology

#### II. ....FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

##### .....A. . Management Review Area

- .....1. . Finding #1 Statement
- .....2. . Basis for Finding
- .....3. . Conclusion, Corrective Actions Underway (If Any), and Recommendation

##### .....B. Systems Engineering Review Areas

- .....1. . Finding #n Statement
- .....2. . Basis for Finding
- .....3. . Conclusion, Corrective Actions Underway (If Any), and Recommendation

##### .....C. . Certification Area (if applicable)

- .....1. . Finding #n Statement
- .....2. . Basis for Finding
- .....3. . Conclusion, Corrective Actions Underway (If Any), and Recommendation

#### III. ....FOLLOW-UP (optional).....

##### .....APPENDICES (see next page)

## Sample Outline for Appendices

APPENDIX A: ..Review Participants

APPENDIX B: ...On-Site Agenda

APPENDIX C: ...State's Project Organization Staff

..... A. . Organization Structure

..... B. . Key Personnel

APPENDIX D: ..System Overview

..... A. . System Description

..... B. . Operating Environment

..... C. . Systems Operations and Maintenance

..... D. . Functions

..... 1. ...Function #1

..... a. ...Description

..... b. ..Inputs/Interfaces

..... c. ...Data Access, Storage, and Organization

..... d. ..Internal Processes

..... e. ...Outputs

..... f. ...Event Scheduling

..... 2. ...Function #2

..... a. ...Description

..... b. ..Inputs/Interfaces

..... c. ...Data Access, Storage, and Organization

..... d. ..Internal Processes

..... e. ...Outputs

..... f. ...Event Scheduling . ....

APPENDIX E: ...Summary of Federal Funding

## **APPENDIX F**

### **REPRODUCIBLE SAMPLE FINDING SUMMARY WORKSHEETS**

## **Appendix F**

### **Reproducible Sample Finding Summary Worksheets**

This Appendix contains sample finding summary worksheets which are produced during the conduct of an Information System Review. The copies enclosed in this Appendix are intended for reproduction and have no page headers or page numbers. Use of these forms is described in Chapter 2, Section C.5., and in Appendix B.

## FINDING SUMMARY WORKSHEET

<b><u>FINDING:</u></b>	
<b><u>BASIS FOR FINDING:</u></b>	
<b><u>CORRECTIVE ACTION:</u></b>	
<b><u>CRITICALITY:</u></b>	
<b><u>CONCLUSION:</u></b>	
<b><u>RECOMMENDATION:</u></b>	

**MATRIX OF FINDINGS: MANAGEMENT REVIEW AREAS**

		Satisfactory	Non-Critical Deficiency	Critical Deficiency	Not Applicable	Reference/ Comments
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	4. Future Planning					
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	4. Documentation and Reviews					
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	1. Data Conversion					
	2. Installation					
	3. Testing					
	4. Users and Training					
	5. Post-Implementation					
D.	Operations and Maintenance					
	1. Resource Utilization					
	2. Operating Environment					
	3. Efficiency/Reliability					
	4. System/Organizational Management					
E.	Cross-Cutting Activities					
	1. Security					
	2. Cost/Benefit					
	3. Internal Controls					
	4. Strategic Systems Management					
	5. System Audit					

	6. Financial Management					
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**MATRIX OF FINDINGS: SYSTEMS ENGINEERING AND ARCHITECTURAL REVIEW AREAS**

		Satisfactory	Non-Critical Deficiency	Critical Deficiency	Not Applicable	Reference/ Comments
A.	System Effectiveness					
	1. Perceived Validity					
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	3. System Availability					
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	3. CASE Tool Usage					
	4. Data Base Management Systems					
	5. Portability					
E.	System Efficiency					
	1. Software Efficiency					
	2. Hardware Efficiency					
	3. Hardware Inventory					
	4. Efficiency Reporting					



	5. Technological Opportunities					
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**APPENDIX G**

**EVALUATION, COMMENTS, AND SUGGESTIONS**

## Appendix G

### Evaluation, Comments, and Suggestions

This Appendix contains a form to use when evaluating, commenting on, and making suggestions about this *Information System Review Guide*.

This *Information Systems Review Guide* was developed to support ACF professionals during the course of state systems reviews. Comments were requested and received from both central and regional office staff and were incorporated, wherever possible, in this guide.

Nonetheless, the true test of any manual is how well it supports reviewers in the performance of their assigned tasks and whether it remains relevant and useful. Therefore, the comment period on this guide remains open.

ACF welcomes suggestions from those using this guide. The *Evaluation, Comments, and Suggestions* form that follows or any other written comments may be sent to:

... .. Department of Health and Human Services  
... .. Administration for Children and Families  
... .. Director, Office of Information Systems Management  
... .. 370 L'Enfant Promenade, SW  
... .. Washington, DC 20447-0001

## Information Systems Review Guide

### Evaluation, Comments, and Suggestions

Questions	Poor	Good	Very Good	Excellent
How do you rate this Guide overall?				
In terms of clarity?				
Organization?				
Useability?				
Contents?				
Length?				
How can this Guide be improved?				
What should be added?				
What should be deleted?				